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This report documents the proceedings of an EPA-sponsored industry-government symposium held in Research Triangle Park, North Carolina, on November 14-15, 1989. The document presents an overview of VOC regulatory programs, a status report on the Clean Air Act amendments, and discussions of possible EPA control strategies for consumer products, the use of market-based approaches to the reduction of VOC emissions from the use of consumer products, and EPA research in the area of consumer products. Presented are discussions of industry's view of regulating consumer products and descriptions of consumer product regulatory activities in New York, New Jersey, and California. Presentations dealing with product testing and the economic impacts associated with product reformulation are also included.

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Proceedings

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SYMPOSIUM ON REGULATORY APPROACHES FOR REDUCING VOC EMISSIONS FROM THE USE OF CONSUMER PRODUCTS

NOVEMBER 14-15, 1989

PROCEEDINGS

Emission Standards Division

Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

January 1990

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CONTENTS

1.0 Introduction.. 1-1

2.0 Symposium Speakers.. 2-1

Day One, November 14, 1989

2.1 John O'Connor, Deputy Director
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Opening Remarks.. 2-1

2.2 John Calcagni, Director
Air Quality Management Division
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Overview of VOC Regulatory Programs and the Nonattainment Problem.. 2-1

2.3 Bill Harnett
Emission Standards Division
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Status of the Clean Air Act Amendments.................. 2-7

2.4 Brock Nicholson
Chief, Policy Development Section
Air Quality Management Division
U.S. Environmental Protection Agency

Possible EPA Control Strategies for Consumer Products..... 2-12

2.5 Ralph Engel, President
Chemical Specialties Manufacturers Association

Industry's View of Regulating Consumer Products........... 2-14

CONTENTS
(Continued)

2.6 John Chamberlin
Office of Policy, Planning, and Evaluation
U.S. Environmental Protection Agency

Use of Market-based Approaches to Reduce VOC Emissions from the Use of Consumer Products 2-23

Day Two, November 15, 1989

2.7 James Weigold, Deputy Director
Emissions Standards Division
Office of Air Quality Planning and Standards

Opening Remarks 2-31

2.8 Dean Simeroth
Chief, Criteria Pollutants Branch
California Air Resources Board

California Regulatory Activities 2-32

2.9 Ted Wernick
Gillette Medical Evaluation Laboratory

Reformulation and Safety Testing - Their Timing and Costs 2-38

2.10 Ted Davis
Acting Assistant Director, Division of Air Resources
New York Department of Environmental Conservation

New York Regulatory Activities 2-46

2.11 Edward Heiden, President
Heiden Associates, Inc

The Socioeconomics of Regulating Consumer Products 2-51

2.12 Sandra Chen
Supervisor, Bureau of Engineering and Regulatory Development
New Jersey Department of Environmental Protection

New Jersey Regulatory Activities 2-59

CONTENTS
(Continued)

2.13 Michael Kosusko
Organics Control Branch
Air and Energy Engineering Research Laboratory
U.S. Environmental Protection Agency

EPA Research Toward Reduction of VOC Emissions from Consumer Products 2-65

3.0 Work Group Summaries 3-1

3.1 Personal Care Products 3-1
3.2 Household Care Products 3-4
3.3 Automotive Products 3-8
3.4 Household Pesticides 3-11
3.5 Adhesives and Sealants 3-15
3.6 Aerosol Paints 3-20

4.0 Agenda and Attendees 4-1
4.1 Agenda 4-2
4.2 Product Category Work Groups 4-4
4.3 List of Attendees 4-6

1.0 INTRODUCTION

The failure of at least 66 metropolitan areas in the United States to attain the National Ambient Air Quality Standards (NAAQS) for ozone by December 31, 1987, is one of the major environmental issues currently faced by the Environmental Protection Agency (EPA). Over 100 major metropolitan areas, representing one third of the U.S. population, are exposed to excessive levels of ozone. In addition, the EPA announced in July 1989 that 37 additional areas are now violating the ozone NAAQS as a result of high 1988 measured ozone concentrations. Consequently, the EPA is developing regulatory strategies to control emissions of volatile organic compounds (VOC's) and to further reduce ozone levels in the ambient air.

The EPA's strategy for controlling ozone focuses primarily on control of VOC's that react in the presence of sunlight and other pollutants to form ozone. During the last dozen or so years, the EPA has developed regulations for major industries that release VOC's to the atmosphere. The EPA has also implemented regulations for automobiles, whose exhausts are a major source of VOC emissions. Most of the remaining sources of VOC emissions are small or dispersed and have been categorized as area sources. Area sources of VOC emissions include, but are not limited to, solvent cleaners, commercial dry cleaners, sites where architectural surface coatings are being applied, and commercial and consumer applications of a wide range of products containing solvents. Estimates of VOC emissions from area sources indicate that they comprise a major emissions source. Thus, the EPA has targeted area sources for regulation.

One measure being investigated by the EPA to address the ozone nonattainment problem is the development of control techniques and regulations to reduce VOC emissions from the use of a variety of consumer products. In order to determine the nature of consumer products as a source of VOC emissions and to examine the possible emission controls applicable to consumer products, the EPA is undertaking an examination of the formulation, use, and emissions potential of these products.

On November 14 and 15, 1989, the EPA held a Symposium on "Regulatory Approaches for Reducing VOC Emissions from the Use of Consumer Products." The objectives for the symposium were the following:

1. Communicate to the consumer products industry that the EPA is considering approaches for regulating VOC emissions from the use of consumer products.

2. Initiate a dialogue among the EPA, the States, and the consumer products industry.

3. Provide a forum for discussing the views of the industry, the States, and the EPA regarding the implementation of alternative control measures and regulatory approaches to reduce VOC emissions from the use of consumer products.

4. Develop agreements for continued industry and State participation in the EPA's investigations of approaches for reducing VOC emissions from the use of consumer products.

Approximately 100 different companies and trade associations involved in the consumer products industry were contacted and invited to participate in the symposium. State regulatory agencies currently involved in the regulation of consumer product VOC emissions were also invited. A list of participants and their affiliation is found in Section 4.0.

The symposium consisted of a combination of industry and government presentations, and work group sessions. There was one work group for each of six product categories: household care products, personal care products, automotive products, household pesticides, adhesives and sealants, and aerosol paints. Each work group was composed of one industry and one government co-chair, and approximately 10 representatives from industry and government. Work group members were generally individuals with expertise or knowledge pertinent to regulation of their specific product category. Each work group also accommodated an audience of approximately 25 interested observers, with limited participation of the observers at the discretion of the individual work groups. The groups addressed regulatory issues and questions as they pertain to their respective segments of the consumer products industry.

These proceedings include the industry and government presentations made during plenary sessions (Section 2.0) and summaries of each work group's discussion and recommendations (Section 3.0). The plenary session presentations have been transcribed from tape recordings; the work group sessions have been summarized by the work group recorders and circulated to work group participants for comment.

2.0 SYMPOSIUM SPEAKERS

DAY ONE, NOVEMBER 14, 1989

2.1 JOHN O'CONNOR, Deputy Director
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Opening Remarks

The Symposium on Regulatory Approaches for Reducing VOC Emissions from the Use of Consumer Products is a unique opportunity for initiating a dialogue between the EPA, State agencies, and the consumer products industry. This symposium is particularly important as the EPA begins to evaluate possible regulatory approaches for reducing emissions of VOC. The timing of this meeting is also very opportune. Right now, the EPA is in the midst of Clean Air Act debates; this issue will be discussed later in the morning. In the United States, there is a very widespread nonattainment problem with respect to the Ozone Standard that is going to require that some unusual measures be taken. The EPA's goal for the last ten years has been to reduce VOC emissions, and essentially all effort has focused on the regulation of large major stationary sources and automobiles. The remaining source categories to be examined are small, widely dispersed sources. That is the reason for sponsoring this symposium today. The EPA must begin to address consumer products as an area source for VOC emissions. [Mr. O'Connor went on to discuss the Research Triangle Park area and describe the functions of the various EPA offices in this area.]

2.2 JOHN CALCAGNI, Director
Air Quality Management Division
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Overview of VOC Regulatory Programs and the Nonattainment Problem

The idea for this symposium predates the EPA's work on the Clean Air Act. Last year the EPA became aware of a number of concerns, concerns of our own, concerns of the States, and concerns of the Chemical Specialties Manufacturing Association. In general, there was a fear that the EPA was vulcanizing the rule-making process for consumer and commercial solvents, that individual States were taking individual approaches and developing rules; there appeared to be a need for national involvement in a development of a regulatory structure in this area. As an agency, the EPA does not have a lot of experience or background in the regulation of this industry, and it was generally felt that, before moving into any kind of active program, the Agency would need a lot more information. This symposium is the start of the information gathering process. The EPA has conducted some research for development of an information base, but sponsoring this symposium is a novel way for the EPA to begin the process of developing a regulatory structure. The consumer products industry is a very diverse industry, one that probably does not think of itself in the same way that EPA thinks of industries. Many present at this workshop have not dealt with one another and are not accustomed to being grouped together. The EPA hopes to informally gather information and begin dialogue. It is also hoped that industry will gain an understanding of the regulatory approaches the EPA is considering, and get a look at the proposed Clean Air Act amendments. In addition, this symposium will include a discussion of the efforts of individual States that are moving in this area, and give some background as to why the EPA thinks this is an area which requires regulation.

The EPA hopes that industries will cooperate in the search for better regulatory solutions. Regulatory solutions have typically been "we are from Washington and we are here to help." We realize that none of you look forward to regulation, but if we work together in this kind of forum, we can come up with the best possible solution in terms of how to regulate in an efficient and effective manner that achieves our objectives and maintains your goals, without hamstringing you unnecessarily in areas where we have no need to impact you. EPA hopes to develop some agreements to continue after this meeting to present and share ideas, develop new concepts, and develop further the concepts that are nurtured here at these sessions.

For the purposes of this symposium, we would like to have a few assumptions for the dialogue that will go on today. We do not mean to preclude your ability to raise these issues at other forums. But in order to make our time more useful, there are certain assumptions we would like to work within. The first assumption is that we are talking of a Federal regulatory structure and the best way to go about it. Debates on whether or not there ought to be Federal regulation in this area will probably not be very useful today. You will have your opportunity to discuss that issue at length before the EPA reaches a rulemaking stage. The other area where the EPA would like to limit discussion concerns reactivity and product substitution. Development of strategies related to reactivity will detract from what the EPA is trying to accomplish at this symposium. We want to begin with the assumption that we are looking at the reduction of the VOC's to be used in products, and pursue the alternatives along those lines. Once again, the EPA does not want to preclude your ability to raise these issues in other forums, and your involvement here does not mean that you accept those concepts. For the purposes of moving forward, however, and developing a regulatory structure over the next two days, we would like to use those assumptions in the work group discussions.

With regard to the format, EPA has contacted a number of industry representatives and we particularly want to thank Ralph Engel for serving as liaison. Each morning session will consist of presentations from Federal and State government officials. Afternoon sessions will be broken into six work groups. The work groups will be: personal care products, automotive products, adhesives and sealants, household care products, household pesticides, and spray paints. Each group will be co-chaired by one government and one industry representative, and approximately ten people have been assigned to each group based on their specific expertise and knowledge. In addition, other interested observers and participants can attend the work group sessions. The primary function of the work groups is to address regulatory issues and questions that may pertain to the specific segments of the consumer product industry. There is an appendix to the background paper that was sent to you, and it has nine questions on it. These questions should be used as a focus for discussion. At the end of the second day, each work group will report a summary of the findings of the entire group.

In conclusion, the EPA would like to personally thank all of you for your interest, not just in attending this symposium, but also your interest in working with us in developing a regulatory structure for consumer solvents and consumer products as we proceed in the future.

Overview of VOC Regulatory Programs and Non-Attainment Problems

Ozone is not directly emitted by consumer products. The precursors to ozone formation, hydrocarbons and nitrogen oxides, are released in urban areas at the approximate ratio of 5:1 hydrocarbons to nitrogen oxides. Major sources of VOC are industrial, automotive, some natural sources, and consumer solvent products. With regard to oxides of nitrogen, power plants and automobiles are responsible for about 90% of the emissions. Oxides of nitrogen are emitted as NO, and react with hydrocarbons. NO converts to NO_2 fairly quickly, with a half-life of about one-half hour. The key compound in the reaction is NO_2. NO_2 generally reacts with hydrocarbons consistently over a three-hour period, peaking in the middle afternoon. Other factors that affect the peak of ozone concentrations are heat and sunlight. The higher the sunlight, the higher the heat, and the higher the concentrations of oxides of nitrogen, thus the higher the afternoon ozone peaks. The peak tends to rise in early afternoon and drop off late in the afternoon as the plume is transported out of the area. Those who live in the northeast corridor will recognize that residual ozone from one day can participate in a second day reaction and a third day reaction as the air mass moves up the East Coast. Thus, emissions of hydrocarbons in Virginia could impact ozone levels in two or three days as far north as New York City and Boston. The EPA has measured plumes of ozone more than 200 miles over the ocean. We have measured exceedances in Acadia National Park that are attributable to plumes from Boston and New York City. So as you see, these plumes can move quite a distance and cover a large geographic area.

On the west coast, the ambient ozone standard of 0.12 ppm is exceeded on the average about 100 days every year. The Northeast corridor has between 25 and 35 days that exceed the ambient standard, with the rest of the country (with the exception of Houston) exceeding the standard for 5 to 10 days per year. This should give some relative sense of the degree of seriousness of the problem. With regard to the magnitude of these peaks; a plot with a summation of 274 sites is an approximation of the EPA's design value. [Mr. Calcagni then showed slides depicting historical ozone trends in the

United States and non-attainment areas.] The ambient standard of 0.12 ppm is not to be exceeded more than once per year on a three-year average. The key message here is that even as a national average, we are not achieving the standard. Over half the monitors in the country are showing violations, and many of them are showing violations that are 2-1/2 times the standard.

To give another sense of where the violations are occurring, the EPA has prepared a map that shows the non-attainment areas. In general, populated areas probably have an ozone exceedance. The areas that are not showing exceedances at this point in time are marginal. Kansas City is marginal, but the Gulf Coast area, Houston, southern California, the Northeast corridor from Washington up to Maine, and the Lakes area around Chicago probably have ozone violations. With regard to the sources of VOC, this is a relatively ubiquitous pollutant. If a production process involves a petrochemical, VOC will be emitted. Approximately 35% of VOC emissions are from mobile sources. These motor vehicle losses are from the evaporation of hydrocarbons from the carburetor and the gas tank, as well as exhaust emissions. Presently, about two-thirds of the automotive emissions are from evaporative losses of gasoline. About 9.6% of VOC is emitted from the industrial category. This is the major 100 ton source.

Area sources account for 29.5% of the inventory, including solvents from numerous products, degreasers, dry cleaners, consumer/commercial products, industrial maintenance solvents, and paints that are used in coatings. Other area sources include gasoline facilities and service stations. To give more information on the consumer products sources, the consumer sector of the area sources encompasses 7% of the total. Though 7% sounds like a small number, the Agency is faced with controlling industrial source categories that might include 1 or 2% in aggregate contribution. The Clean Air Act established automotive tail pipe emission standards and ambient air quality standards for the criteria pollutants.

The EPA has conducted a lot work on the health effects following ozone exposure. At ambient ozone levels, adverse effects can be measured in healthy people. Unlike most regulated pollutants, the ambient Ozone Standard does not have a safety factor of 10 built into it. At ambient levels normal, healthy people can show effects. Tests in California indicate that some of these effects, particularly those in children, are likely to be irreversible.

Research conducted from 1978 to 1985 has shown that ozone is a very potent chemical which can have a very adverse affect on the lungs. Existing regulatory pressures indicate tightening of the standard, not relaxing of it.

The Clean Air Act is structured such that the EPA is required to establish an ambient air quality standard for ozone, and individual States are required to develop and adopt attainment plans, called state implementation plans or "SIP's". In general, States have primacy in the adoption of regulation. The Clean Air Act originally established attainment dates from 1975 to 1977. These dates were revised in 1977 to 1982 and 1987, primarily 1987. The 1987 deadline has now passed, and the Clean Air Act is being revised once again. In the next presentation, Bill Harnett will talk about the proposed Clean Air Act revisions and some of the implications, but generally, we are looking at a maximum of 20 years, generally on the order of 10 years for most parts of the country, to attain the Ozone Standard. In the 1977 Amendments, the Clean Air Act established some minimum requirements for extension, including transportation measures and an inspection maintenance program. The intent of Congress was to take a number of measures that they know to be effective and insist that they be done, but give States time to achieve attainment. This attitude should prevail in the amendments of 1989-90.

In terms of mobile sources, the average of emissions from all cars has come down quite significantly for hydrocarbons and carbon monoxide. Prior to 1981, there was a major difference between the standards and what the average new car would achieve. Since 1981, newly manufactured vehicles have been very clean. The average of all cars, however, is still higher because the typical vehicle on the road is 10 years old. By the year 1991, however, most of the fleet will have turned over. A six-year fleet average is typical, and it takes 10 to 15 years to get the old cars off the road. By 1991, the major benefits of the motor vehicle program will largely have been accomplished.

The EPA expects a major upturn in the total VOC emissions unless additional controls are placed on stationary sources. The motor vehicle inspection program is an example of a regulatory program that has directly affected the public in a way that is very visible to them. The EPA has also published a number of Control Techniques Guidelines. These serve as templates for the States to use in adopting regulations for certain industrial categories. The States can adopt different regulations, but generally the EPA tries to ascertain whether a given State has a unique situation before it is allowed to vary from the EPA's Control Techniques Guideline.

While the EPA has seen some major reductions in the motor vehicle program and in the industrial source category, there are other potential reductions that have yet to be achieved. The consumer solvent area is one area where significant attention is expected in the next three to five years, and that is the reason for this symposium. VOC emission controls will be applied more effectively to existing sources, to a wider variety of sources, and to the smaller sources categories. And as we look forward to the future, VOC control will become increasingly more stringent as we move into our regulatory programs. With regard to consumer solvent programs, it must be kept in mind that a number of States have already moved to control this area source. New York, New Jersey, Texas, and California have all addressed regulations in these areas because of litigation and commitments in their State plans to show attainment. The current Clean Air Act Amendments specifically mention consumer solvents as an area for the EPA to study and to regulate. In some of the later bills, the EPA is directed to move directly to regulation with relatively tight dates. A report is to be completed in two years, and in many cases regulations are to be addressed in three years. In conclusion, there is significant pressure to regulate in this area, and even if the Clean Air Act Amendments do not pass, the litigation structure is such that we may see 50 states moving independently to adopt some rules on sources in these categories.

2.3 BILL HARNETT

Emissions Standards Division
Office of Air Quality Planning and Standards
U.S. Environmental Protection Agency

Status of the Clean Air Act Amendments

The EPA's analyses are starting to show that the VOC inventory from mobile sources and large stationary sources is going to account for less of the total VOC inventory in the future, while the VOC contribution from small sources and consumer products will increase over time. The EPA studies and the Office of Technology Assessment studies both show this trend. The picture that is emerging, and it is emerging in the bills that are coming forth, is while there is still more pressure to keep tail pipe emissions down, at some point the EPA will have to look at sources not previously addressed. The problem that exists, however, is that not a lot is known about the significance of consumer products in the emissions inventory, or what can be done to reduce emissions.

On the Federal level, there are two bills proposed right now; one in the House and one in the Senate. They have slightly different provisions related to consumer solvents. The House started with the President's Bill (H.R. 3030) that requires a two-year study on consumer products and VOC emissions. At the end of the study the EPA is to develop regulations as appropriate. The bill has since been marked up in a Subcommittee and passed on to the Commerce and Energy Committee. At the present time, Committee Chairman John Dingell does not want to bring it in to the full Committee for mark up until after the first of the year. In the Senate, they moved in their own direction with Bill No. 1630 that deals only with the nonattainment problems and with motor vehicles. Their provision is also for a two-year study, followed by regulations within one and two years with an overall mandate to reduce consumer solvents or reduce national emissions from consumer solvents down to 3% reduction of the current inventory. Senate Bill 1630 has been marked up in the Subcommittee. In July, when the President's proposal came out, the House moved quickly to push the President's bill through Committee mark-up. The Senate was waiting to develop its own bill. The EPA had hoped that the Senate would also use the Administration vehicle. It is easier for the two parties to come together if they accept the same base. The Senate did not accept the base, so now there are a lot of differences to be worked out. It is George Mitchell's hope that the Senate bill will come to a vote before they break for Thanksgiving. Mitchell definitely wants to address it before they break for the year. There has been pressure on John Dingell to do the same, to get the bill out to the floor and get a vote on it this year and attempt to work out their differences. One of the reasons that the President hoped to sign a bill in January 1990 was to welcome in the decade of Clean Air. Now they want to sign it on April 20, 1990, the twentieth anniversary of the first Earth Day. It is not clear when the two parties will get into Conference Committee; the original estimates were six months to a year. The EPA is hopeful that, because of an election year, they will be able to get it out early. This Administration clearly wants the bill. There are no issues included that will clearly prevent its being signed. It seems possible to still work something out and soon, but a lot depends on how Congress moves. In the past, the biggest holdup has been that John Dingell of Michigan is the Chair of the Full Committee and Henry Waxman from California is the Chair of the Subcommittee; getting any kind of agreement on motor vehicle tail pipes was impossible.

Consumer products are of interest because the percent of the inventories is growing in the nonattainment areas, and the concern is that too little is known about what can and cannot be done to reduce those emissions. For this reason both proposed bills mandate that the EPA first initiate a study and establish a dialogue with industry. The purpose of this symposium is to start gathering information. It is clear in the Senate bill that regulations will be mandated, that something will be regulated, and some reductions will be achieved. The EPA has no preconceived notion of what percentage of reduction we are going to get out of the consumer products inventory. In any case, the EPA will have a mandate to look at the consumer products VOC emissions and to develop regulations. Industry is encouraged to regularly coordinate with the EPA and to find out the status of development. The EPA will be very forthcoming with the materials we prepare, and as we proceed through the system, there will be formal stages for various reviews.

Question: What exactly is the 3% that is talked about in the Senate Bill and how does it relate to consumer products?

Bill Harnett: What it amounts to is an inventory of 10,000,000 to 12,000,000 tons of VOC emitted annually in the United States in nonattainment ares. The Senate bill requires that EPA achieve sufficient emission reductions from the consumer products area to reduce the future inventory by three percent, taking into account future growth. Three percent is somewhere between 300,000 to 360,000 tons per year.

Question: Does that include the emission inventory estimates; does it include Reid vapor pressure (RVP)?

Bill Harnett: There are two potential Reid vapor regulations. One is 10.5, and the one specified in the Administration's Bill is 9.0. Right now that is not accounted for in the inventories.
Question: Why is one of the ground rules of this symposium to ban any discussion of photochemical reactivity?

John Calcagni: We have been involved since 1970, early 1960's actually, in California's rule 66 on various attempts to use photochemical reactivity. Photochemical reactivity's primary contribution is changing the rate of reaction, the rate of formation, which allows the emissions plume to move into the second and third day of reaction. We have found with second and third day reactions that relative rate of conversion, unless you are talking of converting into a fluorocarbon, at which time it will go into the stratosphere and react, still contributes in second and third day reactions. Our research is indicating that in the Northeast corridor, particularly where we are seeing three and four day reactions, reactivity shifts are not a particularly effective way of reducing VOC. The EPA recognizes that a number of people have disagreements with us on that debate, and the issue should be pursued as a scientific debate with EPA scientists. However, it appears likely that, as we move into an inventory management system, and as all States are pushing toward reducing inventories, VOC reductions, not substitutions, are the likely phases of regulation we are going to proceed with in the next few years. The EPA does not want to hamper efforts to show that considering reactivity is an appropriate approach, but we hope to focus on ways to manage regulation of VOC and reduce emissions.

Question: Is the consumer products category included under the definition of a "moveable" stationary source?
Bill Harnett: No, it is not. Only the section on consumer products is meant to deal with products that emit VOC in use.

Question: [Inaudible]

Bill Harnett: Generally, the States would much prefer a national regulation. It (a) saves them time and resources, and (b) ensures consistency across the country. In some areas, however, both because of the magnitude of the problem and their attitude towards the ozone problem, they do not want to wait on the Federal government. Authorities in these areas will be more aggressive and they will want to address the problem quicker than the EPA might allow for in the bill.

Question: Is EPA going to get more accurate quantification of the VOC inventories, so that in calculating the 3% we have a better number to deal with?

Bill Harnett: The answer is probably not, though if we are forced to at some point, we will have to try to fine tune them. The EPA, however, is not backing the use of that percentage. The Administration has also made it clear that it would prefer not to have that in there. You can measure percent of total inventory, but you really cannot go out and measure to show that you have achieved a percentage reduction.

John Calcagni: In the EPA's attempts to conduct the inventories in the early 1980's, we assumed 3.6 pounds of VOC per capita, which is an appropriate number for commercial solvents. In the mid 1980's, the EPA invested a significant amount of research in developing a national inventory, and more closely examined this category. At that time, we evaluated one category in particular, aerosol cans, and found one billion pounds of VOC per year emitted, which is about four pounds per capita, just from aerosol cans. In general, 7.7% of the inventory translates to about 6.8 or 6.9 pounds per capita of VOC emitted. The EPA has little confidence in this number, and we are very concerned that the Senate bill may lock in a particular number.
Question: [Inaudible]

John Calcagni: The EPA is aware that biogenics do play a role. One way of looking at ozone is that it is nature's scrubber: it is the way that nature removes hydrocarbons from the atmosphere. The biogenics were present before any significant rise was seen in ambient ozone levels. Biogenic VOC contributions must be taken into account, and different controls of oxides of nitrogen in combination with VOC control may be necessary.

Question: [Inaudible]

John Calcagni: It is the general feeling on the part of most States that they want national rules in these areas. There are areas in California, in particular, and some in the Northeast corridor that are concerned that the EPA will miss many dates, that the EPA will not regulate very quickly. The EPA does not have a good track record on making dates, and most States currently do not want to be precluded from regulation, should the Federal government not move aggressively or not move sufficiently expeditiously to help them solve their air quality problems. As long as the States must achieve attainment, they want every tool in the arsenal that is possible.

2.4 BROCK NICHOLSON
Chief, Policy Development Section
Air Quality Management Division
U.S. Environmental Protection Agency

Possible EPA Control Strategies for Consumer Products

Conceptually, regulatory programs are discussed in terms of specifying requirements directly at the point of regulation. This has traditionally consisted of Control Technology Guidelines for stationary sources, for example, and these guidelines are usually fairly specific and point to a particular emission point. This is sometimes referred to this as "command and control". Command and control is a traditional regulatory approach. In the area of consumer and commercial solvents, however, the classic approach is not necessarily the only approach that could be used. While the command and control approach may have appropriate application here, another general category to consider is the incentive or market-based approach.

In dealing with regulation, the EPA obviously needs to consider the point of regulation. Some of the regulatory options will obviously overlap in certain situations. Traditionally, command and control regulation has focused on the point of emissions. For consumer and commercial solvents, the emissions occur during product use, so the person in the home using a spray can, for example, is the one that should be regulated. Obviously, there are a lot of implications there. On the other hand, there may very well be some control techniques that could be employed and directed at the end user.

The next step is the retailer. Again, there might be some advantages for regulating on this level, but there may also be a lot of disadvantages. One consideration, of course, is the efficiency of administering a regulation. The same situation may exist for a distributor, except that efficiency in administering a rule may be increased, for example, by dealing at the distribution point.

Efficiency may also be increased by working with the formulators, packagers or manufacturers. A packager may purchase a product in bulk and repackage it. A formulator may create a product from raw materials, and package and distribute the product. Finally, solvent suppliers may be the most upstream point of regulation. The most efficient regulatory approach may be to identify the solvent going into a product line, or to an industry, or to a company.

Another conceptual approach, one that is market-based, might allow a much wider opportunity for flexibility on the regulated community. But no matter how we conceptually develop a regulatory program, or at whom we direct that program, it must be enforceable. There are various approaches that would achieve this in different degrees. Given the level of enforcement that the EPA is capable of, and given the ability to administer the rules, a rule must be effective. It is also important that the results of a program be quantifiable so they can be measured. The regulation must be logical and clear so that people understand the specifications of the program. In a sense, the simpler, the better. The regulation should not require massive calculations, investigations, and an audit team to determine compliance. A regulation must also be politically acceptable. In addition, recordkeeping and averaging time must be considered; some of the representatives at this symposium have been in many lengthy discussions with the EPA concerning averaging time in other areas. Obviously, the point of control has to be well considered, along with geographic area of coverage. Geographical location determines seasonal effects. For example, will products sold in Minnesota be treated the same as products sold in southern California? Special exceptions such as hospitals and emergency situations must also be considered.

The concept of command and control and the market-based approach are not always distinct from one another. Some command and control options might be product limits on VOC content or weight limitation. These limits could be directed at various points of control: the manufacturer, the distributor or the formulator. A market-based approach might be viewed as a means to provide an incentive to limit emissions, but perhaps with less specificity than allowed under the command and control program (less directed toward a specific product or a specific manufacturer).

The market-based approach might also take the form of solvent allotments. This would theoretically give the regulated community freedom to meet an overall goal without having a specific command and control style of program dictated. Incentives are another way to administer the market-based approach, perhaps as fees. But they do not necessarily have to be trades or bubbles in order to be market-based. Permits are perhaps one way to help administer such a program. Percent reductions may apply across an entire industry or company. In conclusion, there are lots of combinations of regulation, and EPA's objective is to explore all of the possibilities available.

2.5 RALPH ENGEL, President
Chemical Specialties Manufacturers Association

Industry's View of Regulating Consumer Products

The Chemical Specialties Manufacturers Association (CSMA) has a membership of more than 400 firms engaged in the manufacture, formulation, distribution and sale of household pesticides, including antimicrobial products, automotive specialty products, detergents and cleaning compounds, personal care products, and polishes and floor maintenance products, all of which are used in the household or for institutional and industrial use. Many of these products are formulated and packaged in both aerosolized and non-aerosolized form. Most are marketed nationally. In addition, CSMA leads an industry coalition which includes the Cosmetic, Toiletry and Fragrance Association (CTFA) and the Soap and Detergent Association (SDA), addressing the issues relating to consumer and commercial products.

CSMA and a number of its member companies, several of whom are present here today, welcome the opportunity to interact at this meeting to discuss volatile organic compounds as they relate to consumer and commercial products.

You should be aware that commercial and consumer products could include architectural coatings, traffic coatings, and aircraft and marine products and the like, but these products will not be addressed here today, nor are they represented in our total mix. CSMA's membership interest is grouped into the following divisions: antimicrobial division, the aerosol division, the detergent division, the industrial and automotive products division, pesticide division (home lawn and garden pesticides), polishes and floor maintenance division, and commercial and residential services. Our members join the Association as a whole and participate in the divisional interest which best fits the needs of their product mix. A "chemical specialty" is a chemically formulated product manufactured from basic chemicals or chemical compounds and used without further processing by household, institutional, and industrial consumers. The word "specialty" distinguishes this finished product from the basic chemical and chemical compounds from which it is mixed or compounded.

The products contemplated in proposals to reduce emissions from commercial and consumer products are not a particular type or class, but cover a universe of commercial, household, and personal care uses. They include personal care products such as shaving cream and mouthwash, deodorant, perfume, shampoo, and sunscreen; home care products such as window cleaner, furniture polish, floor wax, laundry detergent, and kitchen cleaner; auto care products such as carburetor cleaner, anti-freeze and windshield de-icer; and vital health care products such as disinfectants, sterilants, insecticides, and medicines. In short, they may even include some beer, wine, and alcoholic beverages. In all, we are speaking about a segment of our economy that produces well over 700,000 products and provides some 30 billion dollars to our Gross National Product (GNP). These are products that make all of our lives run more efficiently and conveniently. The contributions made by this industry to the overall quality of American life are immeasurable.

Clean Air and Effects on Consumer Products

These products cannot be viewed in the same way as other emission sources. Commercial and consumer products are an entirely new and unique subject for clean air regulation. This is a category that cannot be dealt with by traditional approaches or control strategies. Its contribution to ozone is not at all clear, and at this point there is no reliable database from which to determine its contribution, or to determine now to approach these small sources of emissions with any certainty or knowledge of whether control is feasible at all. The Office of Technology Assessment (OTA) of the United States Congress confirms this in its comprehensive study "Catching Our Breath: Next Step for Reducing Urban Ozone," published in July of this year. The OTA found that in the area of consumer products, any emission estimates are subject to potentially large uncertainties. The OTA also concluded that it is not clear whether an attempt to control emissions from this source will be either technically or economically feasible. In short, investing huge sums and causing great dislocation, may be pointless. In fact, because control technology information is so lacking for the category, OTA excluded consumer and commercial products from its otherwise thorough analysis of emissions reduction potential and cost. The few studies that exist assessing the feasibility and impact of controlling volatile organic compounds emissions from consumer and commercial products have, for the most part, been undertaken by the industry. These studies indicate that the societal impact of control on consumer and commercial products would be enormous. In late 1986, a study was conducted by Heiden Associates for the industry to determine the cost of reducing VOC content to 50% in underarm products in California. The study concluded that the direct cost to remove VOC emissions range from $49,000 to $98,000 per ton. This was based on data which included, among other things, reformulation costs, incumbent safety testing, plant shutdown and retooling, process changes, and other miscellaneous costs. Furthermore, a study by Dr. Gary Whitten of Systems Application, Inc. investigated the impact of underarm spray products propellants on urban smog formation in California's South Coast Air Quality Basin. This study indicates that mandatory VOC reduction in these products would have a negligible, if measurable, effect on the concentration of ozone in the lower atmosphere. The urban airshed model used as the basis for the study has prioritized the effectiveness of controlling multiple small sources on both a total impact basis, which combines reactivity and the weight of the emissions, and on a per unit impact basis, which normalizes the smog impact to show the control effectiveness per ton.

Fees Are Not an Acceptable Control Strategy

Current legislation submitted by the Administration authorizes the EPA Administrator to employ a system of fees as a method of controlling VOC emissions from consumer products. It was mentioned as one of a large group of control processes. CSMA submits that any generic, unfettered provision authorizing EPA to assess fees carries too high a potential to become simply a revenue-raiser unrelated to ozone attainment, and is likely to be viewed by the courts as an unconstitutional delegation of Congressional power to tax. Economic incentives are useful for controlling emissions for consumer products. However, they raise the specter of governmental regulation on the amount of products that may be sold, and carry with them the potential for seriously interfering with the marketability of consumer products. Their usefulness is obviously very limited.

Consumer Impact

Regulation of consumer products will have an enormous direct impact on consumers. Because of their cost, solvents are used today at a very low concentration level, or only in products for which there is no practical alternative. Therefore, any regulation requiring elimination or major reduction of solvents will result in the disappearance from stores of many useful and necessary products. The monetary cost to consumers will also be great. One category of products that could be virtually eliminated by controls, if they are illogically handled, is aerosols. Any proposed regulations could result in loss of nearly two to three billion aerosol unit sales in the United States alone each year. Besides denying consumers a considerable choice, it would translate into a loss of some $8 billion in sales by American retailers.

If valuable consumer products are arbitrarily removed from the marketplace, consumers will have to rely on professional services to replace the effectiveness and efficiency of existing products. The same jobs that the consumer had done inexpensively would now cost much more to have done by professionals. And even the professionals would be required to find alternatives that would cost them more in labor and materials. These costs certainly would be born by the consumer. Some examples are in order to illustrate these hidden, but very real, costs.

An important product category is total release insecticide. These are in the form of room foggers with constant release lock valves which spray a continuous fog and effectively fumigate a room or an entire home. A single consumer application of this product costs approximately five dollars. In order to achieve the same insect control after adoption of a proposed control measure, a consumer would have to contract with a commercial pest exterminator for fumigation. Each application would cost between 80 and 100 dollars. Imagine that problem in the inner cities of our country.

Aerosol sprays are increasingly common where automotive supplies are sold or in any garage where maintenance work is done. Aerosols provide ease and economy in normal automotive maintenance procedures. For example, using a spray cleaner, dirt, gum, and carbon deposits are removed from an engine carburetor and an automatic choke. The carburetor throat is easily reached by an extension tube on an aerosol can. Gasoline additives used for non-aerosol carburetor cleaning are simply not as effective as direct spray. A 13-ounce spray can costs 3.25 dollars. The shop costs for a complete overhaul and carburetor cleaning of a typical recent model car is $169.00; and this does not take into consideration the amount of VOC spewing out of the tail pipe because of the clogged or dirty carburetor.

For these reasons, we oppose any attempt to reduce VOC emissions from consumer and commercial products without a thorough consideration of societal impact, technological feasibility, and economic effects. We further believe that such consideration just may result in a final determination that such regulations are not very cost effective, or that ozone concentrations are not significantly reduced. However, CSMA welcomes any and all credible efforts to determine whether these products play a part in ozone formation. Let us not prejudge any studies that may be done. And let us not write regulations, mentally or on paper, to meet artificially contrived deadlines. Mr. Bush can wait just a few more months to sign the Clean Air Act if it is rationally concluded.

Waste End vs. Product Regulation

Clean air regulations have all generally focused on the waste end emissions of major sources of pollution in our society. Consumer products cannot be viewed in the same way as traditional sources. The Clean Air Act up to this point has regulated waste emissions and not end-use consumer products created for the benefit of society. The regulation of consumer products raises many different issues. Instead of controlling valueless waste, these regulations will be directed at products themselves. These benefits have to be considered as part of any regulatory decision. Utility plants, for example, may need bigger and better scrubbers, but they will not be closed down. Thus, utilities may be forced to shoulder a heavy and possibly unjustifiable financial burden, but will continue to be viable. Cars may require more effective catalytic convertors or other devices, but no one is advocating banning their sale.

Because emission control devices cannot be placed on consumers themselves, the only means available to control emissions from the products they use is to alter these products if technology is available, or to eliminate them from the marketplace. Alternative technology does not now exist for many of these product formulations. Therefore, the consumer and commercial solvents industry is faced not just with an increased financial burden today, but with the impossible task of quickly reformulating many thousands of products. It would obviously be unacceptable for government to require reformulation of medications (many of them contain VOC), disinfectants, insecticides, and sterilants, and a whole host of other consumer products, for clean air purposes without making sure that the reformulated products or substitutes will be effective.

Interstate Commerce

Most consumer products that are marketed nationally rely upon the freedom of movement traditionally and constitutionally accorded to interstate commerce. If anything should move freely in the marketplace, it must be these many products that are such an important part of modern life. It is essential that any regulation of emissions from commercial and consumer products not erect unnecessary barriers to the free flow of commerce. Therefore, there must be consistency of regulation in a national marketplace. At the very least, any Federal program should take particular care not create incentives for states to adopt different or obstructive requirements for commercial and consumer products. Manufacturers, marketers, and distributors of commercial and consumer products simply cannot contend with patchwork, state-by-state, clean air regulation schemes.

CSMA Recommendations

Because of the lack of data on the contribution of VOC emissions from consumer products to ozone formation, and the economic and societal impact of reducing VOC emissions, any specific action to control emissions at this time is truly without justification. For this reason, we support an approach that would ensure that the appropriate path to minimizing VOC emissions from consumer products is technically, environmentally, and commercially acceptable. Regulation efforts which are based on unproven assumptions, old data, myth, and rhetoric are inappropriate for this industry or frankly, this Nation.

Comprehensive Study of Consumer Products

The non-attainment section of the Administration's Clean Air Bill before the Congress directs the EPA to study and analyze the subject of emissions from consumer products for a two year period. CSMA strongly believes this period is insufficient. As noted earlier, the OTA study, "Catching Our Breath," concluded that very little is known about either the ozone contribution or control technology for consumer products. The agency has said the same today. For this reason, OTA excluded consumer products altogether from its emission reduction potential and cost analysis. A Federal court in New York, in reviewing a State Implementation Plan revision regulating consumer products, concurred with New York State Department of Environmental Conservation's assertion that no valid data exist to regulate these products; and they were limited to three categories. The Court further agreed with the need for a four year study to gather the appropriate data.

The CSMA believes that the best approach is a comprehensive four year study that is conducted by the EPA. During the first year, consumer products should be defined and a complete emissions inventory of the approximately 700,000 products should be compiled. After the inventory is established, a study would is needed that would, at a minimum, identify the following: consumer solvent contribution to the ozone formation; alternatives for reducing VOC emissions from products; economic and commercial feasibility of such methods and alternatives; net environmental, health, and societal impacts and/or value of such methods and alternatives. The study, in addition, would assess and evaluate such other issues associated with volatile organic compound emissions from consumer products as they are identified during a protocol development process.

The study required by the protocol could be complete in approximately 36 months after the protocol has been developed. At the end of that study, if the Administrator at the EPA finds that the regulation of VOC emissions of any consumer product is beneficial and commercially and technologically feasible, then such regulations could be rationally promulgated.

National Consistency

There must be consistency of regulation in a national marketplace, since consumer products are marketed nationally. The CSMA believes that the goal of regulation in a national marketplace can be accommodated with regional necessity. Under certain compelling and extraordinary circumstances, States could adopt additional controls after a finding of need has been made. Current Clean Air Act provisions relating to mobile sources, motor fuels and aircraft make such an accommodation now. Moreover, during the development of Federal regulation, the States ought to be called upon to suspend their own efforts to adopt or enforce standards relating to emissions from commercial and consumer products. The CSMA believes that this not only appropriate, but imperative, with regard to consumer products clean air regulation. Inconsistency could well lead to the destruction of a national distribution system relied upon by this industry, but more importantly, relied upon by every industry in this entire country.

Conclusion

In closing, CSMA would like to publicly object to the assumptions for dialogue for this symposium. We came with an open mind to sit down at the table and have a level playing field. As far as our industry is concerned, we are here on that basis. We do not want any issues taken off the table now or later. There should be room for discussion of all areas. So as far as I am concerned, as far as CSMA is concerned, the three assumptions in this package should be put aside for now.

Also, something that occurred a couple of hours ago is of importance. On September 20, 1989 a Court settlement was signed between the EPA, Illinois, Wisconsin, and now Michigan. It was accepted by the Court last week. The settlement is an agreement to put off a Federal Implementation Plan to regulate a whole host of emission sources until September 1994. The EPA and the States are to participate in a $12 million air quality study which is to be a photoreactive grid modeling study. While doing that study, there are interim control measures established in that agreement which do not include consumer products, again because of the lack of data and the lack of impact analysis.

Finally, CSMA believes that, in the area of commercial and consumer product regulation, we have all benefited from the inquiries and analysis which have been made by both government and industry over the last year or so. Industry and government are more aware of the need to proceed with care, and all of us are a bit more sensitive to the complexities involved in any regulation of emissions from this category. We appreciate this opportunity to present our views concerning the appropriate strategy for establishing a national program for achieving ozone attainment and will indeed work with you.

2.6 JOHN CHAMBERLIN

Office of Policy, Planning, and Evaluation
U.S. Environmental Protection Agency

Use of Market-based Approaches to Reduce VOC Emissions from the Use of Consumer Products

The EPA hopes that, by defining the term "market-based approach to regulation", industry will be able to identify issues of concern that EPA should be aware of as they explore approaches to obtain reductions in VOC emissions from consumer products. In addition, the EPA would like to share some preliminary information on the consumer products industry structure for some product categories of concern.

The EPA is interested in market-based approaches partly because this philosophy is now central to the Administration's proposed legislation for the Clean Air Act. For example, some of the provisions regarding acid rain now allow and encourage utilities to implement the lowest cost reduction techniques to meet prescribed limitations in their SO_2 emissions. They may do so by use of control technology, or they may switch fuels, and they may even buy and sell credits for additional reductions achieved or bank them for future use. This reliance on the free market is a substantial change from the prescriptive philosophy that has been the hallmark of pollution regulation. And this market philosophy carries over to the VOC emissions from consumer products. Again, the Administration's proposal requires a report to Congress that should consider alternative regulatory approaches to those products, including fees, marketable permits, and auctions. Moreover, the proposed language of the Bill specifically exhorts the EPA to consider economic incentives in its regulatory approach.

The EPA is interested in these approaches because they may have advantages both for industry and the EPA over the exclusive use of traditional command and control regulations. For example, the 1977 Clean Air Act prescribed that all utilities had to install scrubbers, regardless of their current emission rates. The EPA now believes marketplace approaches would allow firms the opportunity to respond more flexibly, depending on their individual circumstances, and to save money in the process. Bottom line incentives may also spur compliance. Incentives may also encourage innovations to obtain additional emissions reductions for future use or sale, aspects lacking in traditional command and control approaches. Finally, from the EPA's perspective, they have the potential to ease the knowledge-intensive burden of traditional approaches which typically require very detailed knowledge of either a product or a production process or the performance of technology.

Market-based approaches generally fall into two categories: charges or permits. A charge or a fee system basically imposes a direct cost on a product for emitting pollutants to the atmosphere. Implicitly, a fee system focuses on limiting the cost that society is willing to pay to abate pollution. It foregoes certainty about the amount of emissions reductions. On the other hand, permits specifically limit the amount of emissions to the atmosphere. Permit systems focus on limiting the amount of pollution society is willing to accept and forego certainty about the cost of obtaining those reductions.

Fees and permits have advantages both for the regulators and the regulated. A system of fees can provide an immediate bottom line for any reductions in emissions. Fees can encourage further efforts to reduce emissions while also providing a degree of predictability to the regulated industry about potential compliance costs. Fees do not impose technological constraints on control measures. There is freedom to explore alternative control methods. Similarly, permits provide a quantifiable limit on emissions, allow the regulated industry to buy and sell allocations (potentially lowering the total cost of compliance), rely on markets instead of government to set the price of those permits, and have the potential to provide incentives to be innovative in production, product, or control technology.

Fees and permits, as characterized in this example, raise a lot of issues. For example, how do you set the initial fee charge? How does one quantify those reductions that result from that fee? Who gets the money? When is that charge adjusted and how often? Similarly, there are issues that arise with a system of permits. How is the initial amount of that permit established? How are they distributed? If you are going to run a permit system, how do you assure that there is a fair market with lots of buyers and sellers so hoarding or monopoly situations do not result? What is the life of a permit? What is the area in which the permit operates?

The EPA has a general set of concerns regarding all regulatory approaches. These same concerns also apply to market-based approaches. First, how would the EPA go about quantifying the emissions reductions achieved with a fee or a permit system? Second, what are the administrative problems, especially recordkeeping problems, that are associated with setting up either a fee or permit system; and how are they different from other kinds of recordkeeping requirements that your firms presently face? Finally, with either fees or permits, what are the compliance and enforcement problems both from industry's perspective and EPA's perspective?

The market approaches, using a fee or a permit, are not necessarily exclusive of one another. For example, a permit could have a cap or a ceiling on emissions with a fee for its issuance to cover the administrative cost, and perhaps a fee in excess of that cap, in effect, a penalty. Alternatively, one could couple a market permit with traditional approaches. One could have a permit with a cap plus a mandatory annual percentage decrease in emissions. Those of you who are familiar with the Agency's phase-down of CFC's are in fact looking at exactly that kind of system. Obviously, there are many other possible combinations. The EPA is interested in hearing industry's ideas about what those combinations might be.

To the EPA, the consumer products industry structure is extremely interesting because of its implications for the choice of the regulatory approach. There are literally thousands of consumer products in the marketplace, with millions, possibly tens of millions, units sold annually. The individual emissions from these units are small, but in aggregate they are large. Putting aside the questions about the inventory, the EPA's estimate of VOC emissions is approximately 154,000 tons a year. We agree that direct control at the point of emission to the atmosphere is totally impractical, if not infeasible. And similarly, control at the point of retail sales seems inefficient. However, as one moves back in the distribution chain, the number of points of control diminish substantially. Based on information from various trade publications, the EPA estimates that there are approximately 100 manufacturers of window and glass cleaners, about 200 for all purpose cleaners, and about 400 for room deodorizers and disinfectants. Alternatively, consider the aerosol paints category. Again, the number of products and the number of units sold is likely to be very similar to those for household care products. The EPA estimates aggregate annual emissions at about 159,000 tons. However, as one moves back in distribution chain, again, the picture is quite different. Based on information from trade association sources, it is estimated that there are approximately 25 formulators aerosol paint. That makes a substantial difference in the way one thinks about how one might regulate, if one chooses to do so, in this area.

The point of these two examples is simply that the better the EPA understands the consumer products industry and its products, the better we can tailor the fit of the regulatory approach to industry's needs. We do not believe that "one size fits all" is the best approach. The EPA is truly interested in exploring alternative approaches. As the number and diversity of these sources increase, the problem grows almost unmanageable.

Question: There appears to be a lot of thought given by the EPA speakers to the determining of fees or permits or charges and collecting the money. But I haven't heard what would happen to that money and how it would benefit the reduction of VOC emissions. Can you please tell me what would happen to the money?

John Chamberlin: We don't have an answer to that. In one of the earlier versions of the Clean Air legislation, the language said something about money accruing at the Treasury, to be used by EPA for future research and development. There are possibilities to rebate these kinds of revenues to the industry so the money doesn't necessarily have to leave the industry. There are questions about how one goes about returning those revenues to the industry, if the charges are based on the unit of VOC content in a product. You don't want to be collecting revenues on the one hand, and just giving it back on the other. That accomplishes nothing.

John Calcagni: The acid rain bill under consideration has a remarkable system of permits in it. Under that system, the utilities are each issued an allocation of sulfur emissions that the EPA then manages in terms by establishing a trading system and a market. Utilities are also free to trade those allocations at whatever price the market will bear. In discussion of fees, the EPA is concerned with finding one that's revenue neutral. We're not in the business of balancing a budget.

John Chamberlin: Fees can operate in two different ways. With a permit system, one could charge a fee for the permit, and the cost of that fee would presumably be nothing more than the administrative cost of running a permit system. That doesn't really generate revenues; that just covers the administrative costs of a permit. Alternatively, one can run a fee system based on the content of the product. First, we're going to have to decide what that charge is. This type of fee does have the potential for raising revenues. Those revenues could go into an industry fund for further research. They would not necessarily have to go to the Agency. We haven't decided in any way what happens to those revenues. In fact, one of the sticky issues in talking about a fee system that generates revenues that is not as John said, 'revenue neutral', is how to use the revenues. It's something that the EPA is sensitive to.

Question: What has the Agency learned from the experience with the CFC regulations. In particular, how are those fees going to be applied or used, and how might that relate to the consumer products issues?

John Chamberlin: My understanding is that that's a permit-base system, not a fee-base system, where allocations to the manufacturers are being reduced over time. The amount of CFC-containing product that can be produced is being curtailed.

Question: Would you explain how the permit concept would apply to consumer products. For stationary sources, a permit is usually issued to control a particular facility, but there is no limitation on what products can be produced. Are permits for consumer products permits for a particular product line, for VOC's generally, or for a specific product? How would it work?

John Chamberlin: One approach would focus on the manufacturer. Each manufacturer is allowed a certain number of pounds of VOC per thousand units of consumer product. These allotments are tradeable; they are a right to emit, if you would, and you can emit, you can keep the allotment for growth, you can sell it to a competitor, you can swap it within your firm, you can sell it to somebody who is not a competitor. It becomes a market-based system. Another approach would focus on formulators, or solvent suppliers, depending upon the nature of the product. The CFC program is an example where the supplier is regulated. All of these approaches are on the table, and we are actively exploring these sorts of approaches.

The EPA is finding that, because of the potential for the CFC prices to rise, industry is seeing an opportunity for new products, improved products; they're looking upon it as an advantage, as an opportunity to make some improvements and to take advantage of business opportunities. For the ozone non-attainment issue, some of the same philosophy may prevail in industry. This is not necessarily something being imposed upon industry, so much as an opportunity to make some new products, and see some improvements not only in the product, but also in the environment.

Question: Is there any plan for standardizing testing of VOC content of products?

John Chamberlin: Historically, the EPA has been in the business of providing test methods. Rather than a generic method, we may be able to work out inventory records, and assume that what you buy is what you emit. The EPA will bring this issue to the attention of the test and methods people.

Question: Just a comment: there have been some parallels drawn between acid rain and CFC issues. Those two issues both involve long-lived atmospheric species. It doesn't matter where SO_2 is emitted, whether it's Indiana, Illinois, or Kansas, or what have you. CFC's are also long-lived. However, the point of emissions of VOC is very important, whether it's in an attainment area or a non-attainment area must be a consideration.

John Chamberlin: Very true; the issues of geographic location, and of reactivity are important. The EPA has invested heavily in a photochemical dispersion model in the Northeast called the Rondette exercise. As I indicated earlier, we do find that the dispersion occurs beyond the urbanized areas. And there is a question as to whether transport from outside the Standardized Metropolitan Statistical Areas (SMSA's) are indeed also contributing to non-attainment. With regard to reactivity, the models we do run differentiate between species. They consider the characteristics of each of the species in evaluating, on an area-wide basis, what the potential impacts would be of different reactivities. Those features are built into the EPA's evaluation techniques. I will tell you that we're having difficulty in showing attainment with our models even with maximum technologies.

Those of you who remember Rule 66 will recall that there weren't any substitutes for stains and creosotes. The EPA defined boundaries where sale of creosote was legal; for instance, outside Route 128 in Boston sale of creosote was legal, and inside it was illegal. The EPA does not want to create that situation in the consumer product market, where there are artificial boundaries with high solvent products on one side, and low solvent products on the other. The EPA recognizes this as a concern.

Question: I believe that a good definition of VOC is necessary. The California Air Resources Board (CARB) staff defines VOC differently than the emissions control laboratory at the University of California at Riverside. For CARB's purposes, carbon monoxide is not a VOC, methane is not a VOC; but it still is a volatile organic compound, and both of these contribute to ozone formation. Is the EPA defining VOC's differently that on the basis of volatility. Another definition which came up at CARB meeting addresses high, medium, and low volatility VOC's. Does volatility make any difference or is it just a question of time? Most organic compounds do have some kind of vapor pressure; Whether a compound has a higher or lower vapor pressure might make a difference of a couple of hours, but, in either case, the compound will eventually go into the atmosphere. With regard to EPA's definition of volatile organic compounds, many of you have dealt with state regulations that have different regulatory structures. Some of them have a tenth of millimeter of mercury as an exemption cut point. Others have specifications of certain chemicals. We have attempted to standardize the definitions throughout the states. The states are presently all going through a regulatory process. One of the issues we've looked at in California is how they define VOC's. There will probably not be a vapor pressure limit in the state regulations. We have found that certain high boilers with low vapor pressures are, in fact, get emitted in the air as an aerosol and do eventually convert to a volatile organic compound. Compounds in printing inks are an example. California will not exempt those compounds. Our definition is quite broad. It exempts methane and ethane, certain chlorofluorocarbons, and methylene chloride, as being nonreactive. In addition, carbon monoxide (CO) would not be included, metallic carbonate would not be included, and carbon dioxide (CO_2) would not be included. These compounds are not organic in nature. They do participate in photochemical reaction processes. We have found that CO does in fact play a role, but it's not a very active compound and this would be incorporated into our modeling. But virtually all other compounds that are typically considered organic are covered. There isn't a long list of exemptions, nor do I anticipate expansion of that list. Virtually everything has some photochemical reactivity under atmospheric conditions that would occur during two and three days of transport. In general, it is a broad definition, and getting broader, as opposed to getting narrower.

DAY TWO, NOVEMBER 15, 1989

2.7 JAMES WEIGOLD
Deputy Director
Emission Standards Division
Office of Air Quality Planning and Standards

Opening Remarks

The initiation of this process exemplifies what has become something of a change in the way the EPA has been operating. This has been a gradual change that has been taking place, and it is gaining in momentum. The EPA wants to encourage consultation and communication, not only with the regulated communities, but also with the State and local agencies that have to carry out the rules. In a way, that was a hole in the way the EPA operated in the past. We have been working actively, certainly at OAQPS, in the last year and a half to try to improve our relations with State and local agencies that are responsible for improving air quality and dealing with industry. The EPA has not only worked more closely with State and local agencies, but we have also begun to negotiate regulations. We worked closely with the woodstove industry and promulgated regulation for the control of emissions from woodstoves. The EPA is currently involved with the chemical industry in negotiating rules for controlling equipment leaks. In addition, the EPA's new administrator Bill Reilly puts great stock in the need to work cooperatively with industry, and he has called some nine companies to deal with the issue of air toxics emissions, including GE, DOW, and Exxon. He met with them in August and asked them for cooperation; they agreed and said it is a problem we are going to have to work on together. The EPA is in the process of working with those companies as they develop plans for voluntary pollution reductions.

This process is similar. The EPA wants to meet with representatives from State and local agencies and industry to create a more effective program. The EPA needs the cooperation of industry and their expertise to do it well. It is hoped that industry will see this as an opportunity to get into the process. If the Congress should pass a law that says the EPA will produce a report in two years and produce a regulation in four years, and industry is not part of the process, they run the risk of getting regulations that are not the most effective from their standpoint.

If there are long protracted delays, you will also run the risk of having a proliferation of State regulations that will be difficult to deal with. Different states may have different definitions of VOC and different labeling requirements. The EPA hopes that the consumer products industry representatives will have the sense to participate, and the ability to get their views into the process early.

The discussions that will take place today will include the technical issues and alternative control measures, including changes in the method of application, product reformulation, and product substitution. Dean Simeroth of the California Air Resources Board (CARB) is going to describe California's consumer products control plans. Ted Davis from New York will discuss New York's efforts to reduce VOC emissions from air fresheners, disinfectants, and insecticides; and Sandra Chen will describe New Jersey's program. From industry, Ike Emery of Helene Curtis will talk about VOC's in consumer products and the functions that are involved in propellant solvents, active ingredients, carriers for the active ingredients, and the associated problems. Ted Wernick of Gillette Medical Evaluation Laboratories will discuss the time and costs associated with reformulating and safety testing of products. Ed Heiden of Heiden Associates will discuss the economic implications as well as the social effects of regulating consumer products.

2.8 DEAN SIMEROTH
Chief, Criteria Pollutants Branch
California Air Resources Board

California Regulatory Activities

In California a solvent is defined as a carrier vehicle for applying solids, a propellant binder, active ingredient, or a cleaning agent. Over 90% of the population in California lives in nonattainment areas. In terms of emissions, solvents account for about 830 tons per day out of 1900 tons per day for total non-vehicular sources. Our vehicular sources emit another 1900 tons per day. Consumer product emissions are about 230 tons per day, and other surface coatings (basically industrial-type surface coatings) emit about 320 tons per day.

The California Clean Air Act was passed last year and will become effective January. It requires us to reduce total emissions contributing to ozone nonattainment by 5% a year, both NO_x and volatile organic compounds. CARB was given authority over consumer products for the first time, so the individual Air Quality Management Districts do not have to adopt their own regulations. The districts were not preempted from adopting regulations, however, if we adopt a rule, the only thing that they can adopt is exactly the same rule. The Air Resources Board must, however, assure that the regulations are necessary and technologically and commercially feasible.

For non-consumer products such architectural coatings (specifically exempted in the California law), industrial coatings (320 tons per day emitted) and industrial solvents the Air Resources Board does not have direct authority. Three committees with the local air pollution control districts were established to deal with these solvent use categories. There are a total of sixteen committees working on various control measures in California. The Air Resources Board works with the committees to come up with a concept, and there is a minimum of three workshops with industry and the interested public. If a concept is approved by the ARB's governing board, it is then distributed to the districts with our strong encouragement to adopt what we have developed, since they have participated in the development.

For consumer products, a public hearing, rather than a public meeting, was held because the Board is adopting actual regulations, and we have the enforcement authority. For non-consumer product categories, we will be working on regulations for aerospace, automobile refinishing, marine coatings, polyester resin in wood products, and wood furniture. Next year we will be looking at industrial/commercial application of adhesives, architectural coatings, general organic solvents, cleanup solvents, and add-on control technology. In addition, the Air Resources Board is sponsoring research and is involved in support activities. For transfer efficiency test methods for coating application techniques, we are revisiting our test method for voluntary organic compounds in coatings. We are looking at technology that exists for automobile refinishing, and investigating the potential uses of economic incentives.

For consumer products, our emission inventories total about 230 tons of VOC per day. Personal care products are thought to emit about 80 tons a day; automobile and industrial sources emit about 80 tons a day; and household products are thought to emit about 50 tons per day. The Air Resources Board is looking at the regulations that have been adopted by the other States and is working actively with other States. The ARB is looking for regulations for personal care products by July 1990, household products by January 1991, automobile/industrial products by July 1991, aerosol paints (suggested control measure) by July 1991, pesticides regulations by July 1992.

Last week the Air Resources Board adopted the regulation for antiperspirants and deodorants. Final adoption will occur when the administrative process is complete and another public comment period is held. Basically, any supplier, retailer, or manufacturer will be affected. ARB has added some definitions to address propellants, solvents, solids, and active ingredients. There will be administrative requirements, labeling requirements on each unit, and annual reporting requirements for units sold in California. There will be some exemptions; for example, products manufactured for sale outside of the state are exempt. Colorants and fragrances up to 2% by volume are exempt. We precluded anything that has already been identified as a toxic air contaminant through our toxics program, including fluorocarbons.

The plan will be implemented in phases. In phase I we put a cap on existing levels of the VOC content. Phase II will mean a 20% reduction. The Board changed the date for the 20% reduction from January 1, 1994 to January 1, 1992. Another 60% reduction of emissions, for an overall 80% reduction from antiperspirants/deodorants, will translate to slightly over four tons per day emissions reduction. The Board approved a final compliance date of January 1, 1995, and added a clause stating that if, by January 1, 1994, any manufacturer submits a plan for reformulation to non-VOC propellants and includes key dates in their plan, they will have until January 1, 1999 to comply for the aerosol products. The plan also establishes reporting requirements for progress towards the January 1, 1999 date.

In conclusion, the Air Resources Board is addressing a wide variety of different source categories including motor vehicle fuels and motor vehicles. We feel this plan is only going to be successful if it's a cooperative effort between the Air Resources Board, our local districts, industry and the affected public.

Question: Is the exemption for ethanol in existing products a generic

exemption or for specific products. Take hair sprays as a generic example.
Dean Simeroth: The only thing we've adopted so far for ethanol is the antiperspirant/deodorant regulation. So there is no regulation specifically for hair sprays. But for antiperspirant/deodorant products, a new product would be precluded from having ethanol in the non-aerosol form; the aerosols can have up to 10% VOC in new products.

Question: In development of the California regulations, you have looked at the correlation between VOC content and emission rates or emission reduction. It seems that a reduction in VOC content is not necessarily directly relatable to emission reduction, in that you can reduce your VOC content, increase the product use, and have no net reduction or conceivably an increase in emissions. To what extent have you dealt with that in your standards?

Dean Simeroth: To the extent that we're able to foresee how industry is going to change, our intent is obviously to have a net reduction of emissions. One of the things that has kept us from proceeding with the hair spray regulation is the concern that a shift from aerosols to other forms of hair spray (that may have an even higher alcohol content) may inadvertently cause an increase in emissions. This issue came up during adoption of our architectural coating regulations last May. Our final conclusion was that we had no evidence that regulations were going to result in increased emissions.

Question: You had an entry on your time line of a date of December 1989 for determining the feasibility of a generic aerosol regulation? Could you explain that little bit?

Dean Simeroth: What we're looking at is something similar to what we have done for architectural coatings (architectural coatings have a general standard of 250 grams per VOC per liter of coating minus water). Within that regulation there are about 30 categories which have higher limits. Likewise, for aerosol regulations there would be some type of general standard, and each individual category would have an individual limit. Generic is probably too strong a word.

Question: Could you comment on the decision to exempt products manufactured for export from the State of California, given the fact that this a national problem?

Dean Simeroth: Unfortunately, we don't have authority for any state other than California. If products are not going to be used within the state we feel there would be need to regulate them. The manufacturing process would be regulated under other authorities, usually local district authorities within the State.

Question: Have you been able to come up with any figures on the cost to the consumer per ton of VOC reduction, financial cost and cost in less desirable products?

Dean Simeroth: We estimated that the annual cost for the antiperspirant/deodorant regulations will be two to four million dollars per year. The increased cost per aerosol unit is estimated to be 20 to 50 cents per unit.

Question: You prioritized both by type of product and to some degree by type of VOC. Do you have a technological justification for that prioritization process, and do you have a plan for measuring the impact of each of the steps in the priority process, both in VOC reduction and in impact on ozone production?

Dean Simeroth: A lot of these processes are simultaneous, so in our initial prioritization we looked at the categories whose emissions we felt were technically feasible to control. Pesticides are last because we recognized we're going to have to deal with the FIFRA process to address pesticides. In terms of the technology impact on the individual products, that will be done as we complete the regulation development. One extreme possibility is that, if we get into regulation development for a product category and discover that regulation is not feasible for one reason or another, we may just drop the regulatory process. Our requirement for adopting a regulation is to examine environmental and economic impacts. When we adopted the antiperspirant/deodorant regulations, we looked at ozone depletion, global warming, economics, the existing alternative product forms, and the potential for development of new aerosol propellants. In terms of actual ozone reduction, we have a network of 100 ozone monitors. We usually look at the three-year averages for overall impact on ambient ozone concentrations. In terms of photochemical reactivity, the Board's policy is to look at mass reductions of VOC's first, and then we start exploring how we can shift the reactivities.

Question: [Inaudible.]

Dean Simeroth: Usually there are so many regulations being adopted in any one year that there's no way to really see the impact of a single regulation. If a single regulation reduces emissions of four, or five, or ten tons of VOC out of 3800 tons, it will be hard to see an impact. The industry had Science Applications International Corporation (SAIC) do an analysis, and they found that a two ton reduction in the South Coast would be a 0.006% reduction in ozone.

Ralph Engel: The California Air Resources Board's cost estimates for reduction were $0.50 to $1.20 per pound, while CSMA's cost studies showed between $1.64 and $12.67 per pound. For aerosol underarm products in California, that translates out to about $30 million additional costs annually. And in addition, each manufacturer will need to complete their own laboratory formulation, safety testing, and manufacturing modifications at significant capital and development costs of several million as well.

Question: You said that one of the reasons that pesticides will be addressed last is that you recognized that you would have to deal with FIFRA problems. Why are disinfectants, which are also FIFRA products, included in the household products category instead of with the pesticides?
Dean Simeroth: It was an arbitrary classification into that category. We recognize that disinfectants fall under FIFRA as well, and this will have to be considered in the process.

Question: Just recently, the ARB has taken away exemptions for HCFC's. Is that something that the Board did contrary to the suggestions of the staff, and if so, why?

Dean Simeroth: The Board, in my opinion, never does anything contrary to the suggestions of staff. The Board recognized the political impact of the ozone depletion problem in California, and they set a standard that no compound with an ozone depleting potential greater than 0.00 can be used.

2.9 TED WERNICK
Gillette Medical Evaluation Laboratory

Reformulation and Safety Testing - Their Timing and Costs

As many of you know, since 1978 consumer products were banned from using fully hydrogenated chlorofluorocarbons as propellants for aerosol products. The concern, of course, is that the CFC's were contributing to the depletion of the protective ozone layer. The ban was instituted by the EPA, the Food and Drug Administration (FDA), and the Consumer Products Safety Commission (CPSC). Industry turned to existing alternatives, namely butane, isobutane, and propane. Ozone depletion by CFC's is still an issue. In addition, Federal, State, and local governments are concerned about tropospheric ozone formation. In order to further reduce the amount of ozone depletion by CFC's without contributing to an increase of ozone in the troposphere, a chemical industry consortium has developed a series of HFC's (hydrofluorocarbons). Information released by the manufacturers of these products leads us to believe that they may be usable in consumer products. However, the safety of these new products has not been determined.

The purpose of today's presentation is to demonstrate the nature and extent of toxicological investigations that are needed to establish the safety of consumer products utilizing new propellants. It must be established that the products are safe for the men and women who manufacture them and safe for the men, women, and children who use the products.

Basically, a consumer product is made up of three components, the active ingredient, the vehicle, and the propellant that is needed to get the product out of the can. Perfumes and colorants are added for aesthetic reasons. The development of each of these components must include a safety evaluation of the individual ingredient. The manufacturers of consumer products are responsible for the safety of the final product. The components, when mixed together, may have additive or synergistic effects. Therefore, the nature and the extent of testing cannot be determined for a product until a formulation is developed and preliminary tests are conducted and evaluated. The obligation to substantiate the safety of products and ingredients is both a moral and legal one. The Toxic Substances Control Act and the Food and Drug Act both require substantiation of the safety of new products before they are marketed.

The development of consumer products with a new propellant is basically divided into four phases. The first phase is the development and testing of the new propellant. The second phase is the laboratory formulation or product development; the third phase is safety testing of the final formulation and preparation for marketing. And of course, the last phase would be the market research, manufacture, and distribution of the new product. Some of the phases must be conducted sequentially. Other phases may be conducted either simultaneously or may overlap each other.

The first phase, the development and testing of the propellants, is now in progress as the chemical industry consortium is already investigating certain propellants. These propellants are mainly for blowing agents and refrigerants. The results of these studies are expected to be available sometime in 1994. And it will probably take another year or two for this data to be published and peer reviewed in the toxicology or medical journals. The information provided by these evaluations will provide basic data needed to develop and safety test a line of consumer products. Consequently, toxicological investigations and product development cannot begin until 1994 at the very earliest. However, recently it was learned that the propellant HFC-134a, one that most likely could be used in consumer products, has not begun its two year toxicology studies.

The next phase after the evaluation of the propellants, the formulation phase, involves selection of the valve to determine the spray rate or the spray pattern of the product; can size and can strength also have to be determined. Then stability testing, compatibility of the can with the product, and efficacy testing are required. Preference tests with human subjects obviously cannot begin until animal studies at least have been initiated and evaluated.

The third phase is the actual safety testing. First, toxicity studies are conducted. Dermal toxicity tests determine if a new product absorbs through the skin. Inhalation toxicity of these products is also evaluated. Animals are exposed appropriately to the new products, and then observed for a period of approximately 14 days. Animals are examined for convulsions, respiratory rate changes, agitation, body weight changes, and survival. Animals that survive are sacrificed at the end of the observation period and are also examined grossly and microscopically. Primary irritation studies are also conducted to determine the effects of a single application to the skin, and to the eye. Respiratory irritation studies determine whether or not a new product would cause upper or lower respiratory irritation. Sensitization tests determine whether or not the products will cause sensitization or an allergic response.

Tests are also conducted to determine the potential for carcinogenicity. These begin with the standard Ames test. And then, depending on the results of the Ames test, information from suppliers, the medical literature on the propellants, and the vehicle and the active ingredients, in vitro tests may also be conducted. The testing for acute toxicity, irritation, sensitization, mutagenicity, can be conducted simultaneously. This would take an eight-month period. The cost, depending on the types of tests, would be between $40,000 and $80,000 per product.

A subchronic test is then conducted to determine longer term effects and target organ toxicity, and to delineate exposure levels for the chronic or lifetime study. The duration of the subchronic test is approximately three months. Animals are examined for an additional three-month period to determine if any of the effects observed are reversible. The exposure level used in the subchronic test is usually based on the acute studies, the information we've received from the suppliers, and the medical literature on other components in the product. Changes in body weight, food consumption, behavior, and survival are observed. Complete blood and urine analyses, blood chemistries, and pathological examinations are run on all animals that die during the course of the study and those that are sacrificed during the end of the three-month exposure period, or after the three-month observation period. And of course, all the data are subject to statistical analysis. The time required for this phase is 12 to 14 months, and the cost is approximately

$200,000 per product.

Chronic toxicity is the next phase. The objective here is to determine the effects of each exposure level, to determine a no observed effect level, and to determine a margin of safety, that is, the margin between the exposure level during product use and the level where no observable effects occur. The duration of this test is generally 24 months. There are three exposure levels: low, middle and high, and a control level. The exposure levels are based on the information derived from subchronic studies and medical literature, and human exposure is taken into consideration. Here, the same types of observations as in the subchronic study are conducted, along with an evaluation of tumor development.

A true carcinogenicity study or a lifetime study with the product is conducted. At this time, we can also conduct teratology studies. The objective of a teratology study is to determine the effects of exposure of pregnant animals to consumer products on the embryo, fetal viability, and development. The animals are exposed at various levels, and a maximum tolerated dose is used as the highest exposure level. Sacrificed animals are examined for such things as body weights, clinical signs of toxicity, viability of the pups, fetal weights, gross observation, examination of serial sections of pups, skeletal examination to determine the effect on the long bones, and the effect on the various organs. The estimated time for the teratology studies is 12 months, and the costs are approximately $150,000 per product.

The reproductive phase can also be conducted. In this phase of the study, we determine the effect of a product on three generations of animals. The animal of choice is generally the rat; the first generation is mated from that generation, a second and a third generation. We keeping exposing the animals at this time, and keep mating them to determine the effects. We determine mating indexes, fertility indexes, live birth weights, 24-hour survival, 4-day survival, and 21-day survival. Animals are examined for malformations when possible, and a statistical analysis is conducted as well. The time required for this phase is 12 months, but it can be run simultaneously with the teratology study and chronic toxicity study. The cost for this study is approximately $270,000.

The final phase is market research, manufacturing development, and distribution of the product. In market research, consumer use studies are conducted to determine the effects and the feelings of consumers. This study cannot be started until a sufficient time has elapsed in the longer term studies to assure the safety to the consumer. Procurement and installation of manufacturing equipment must be done when the company has a feeling of certainty that the tests will come out satisfactorily. The final stage is production and distribution. The time period required for this phase is roughly 30 months. It must be emphasized that the time and costs that are mentioned throughout this presentation assume that no problems arise.

In summary, the purpose of this presentation was to demonstrate the extent and nature of toxicologic investigation needed to establish the safety of aerosol consumer products involving new propellants. The tests described range from those that evaluate acute toxic effects, irritation, and skin sensitization to chronic toxicity, carcinogenicity, assessment of reproductive toxicity, and teratogenicity. While several tests can be carried out simultaneously, the starting point would be when the propellant is made available and the formulation is identified. It is projected that the total minimum time needed to complete these studies is approximately six years. Assuming that propellants and the safety data for these propellants would be available for 1993, the earliest that industry could possibly have a new product on the market is 1999.

Question: [inaudible]

Ted Wernick: The total cost for the safety testing portion of a product would be approximately $1.5 million per product.

Question: How much of this testing is just an ongoing process, looking at existing product improvements and looking for new products? Are some of the costs you presented basically costs that reflect this ongoing in-house capability? You must have some funding for this as part of your normal business. Can you separate these costs from having to replace a whole line of products?

Ted Wernick: Of course there are ongoing R&D and ongoing toxicological evaluations. This discussion concerns a brand new ingredient, one that has never been used before. We're talking about an ingredient that hasn't even been released. I must emphasize that these are the tests that we anticipate will have to be done. Once the chemical industry releases the information, we may decide that more testing or less testing is required. Some monies are always available, and we are all looking to have a better product, one that is new and improved. But when it comes to a brand new ingredient, it's hard to say.

Question: Could you comment on other factors besides the VOC issue? You mention animal testing for example; there's a strong movement for animal rights and possible requirements for changing some of those tests from 1993 to the year 1999. What kind of impact, would you expect that to have on both timing and costs?

Ted Wernick: It could have a very significant impact. The most serious impact may be sabotage from extreme animal rights groups. In fact, the FBI has labeled one of the groups, the Animal Liberation Front, as a terrorist organization. They have done a fair amount of damage to a number of universities. And if they hit a place where one of our studies is being conducted, on the last day of a two-year study, there would be a tremendous impact. The rat becomes exceedingly more and more valuable each day of the study. Otherwise, I don't believe that any of the laws or regulations that the animal rights people are trying to implement will impact this type of investigation. But I could be wrong.

Question: Regarding hair sprays and antiperspirants in the aerosol formulation, if we use our hypothesis that testing has been conducted on the HCFC's, chronic testing, things of that nature, and it comes up clean, are you saying that you'll have a tiered approach for the actual formulated products? Are you still going to conduct chronic testing if it has been done on the active ingredient and the propellant already?

Ted Wernick: That would depend on the results of the subchronic and acute studies.

Question: It's a tiered approach. You're going to start out with the acute and mutagenicity?

Ted Wernick: We would have to, definitely.

Question: Is it true that not too much chronic testing being done on formulated products on a routine basis?

Ted Wernick: You're right. However, we have to keep that option open. I tried to emphasize that each sequential step determines the need for subsequent steps.

Question: If we assume the test results are in by 1994, you estimate that it would be 1999 before the product would be released?

Ted Wernick: Yes.

Question: Is that assuming that you would have to go through the whole range of testing? If you stopped at the acute or subchronic portion, would that subtract from that point?

Ted Wernick: Of course. But we can't commit to anything until we have the data. We haven't had the first sample of any new propellant.

Comment: [Don Strubach, DuPont]. Those of you who attended the EPA/Industry CFC Ozone meeting in Washington on October 10-11, 1989 must realize that it is extremely unlikely that HCFC's will be permitted for nonessential aerosol uses by the Agency. In addition, I would like to comment that our company has no plans to make HCFC's available for such aerosol uses.

Comment: [Leonard Drell, Demert & Dougherty]. To my knowledge, this so-called consortium is greatly a figment of the imagination. If there were a valid consortium, there would have been invitations to the people now in the propellant business to join them. To my knowledge, no one in the hydrocarbon propellant business has been invited into this consortium, and there seems to be a decision that hydrocarbons are to be abandoned. Part of the purpose of the investigation of propellants is to improve the species of hydrocarbon and finding out more about hydrocarbons. Much of the regulatory approach has been to assume that all hydrocarbons are the same. They are not; and another assumption is that they are really a factor in ground-level ozone. They can be made less a factor. I think that giving this industry and this audience an assumption that there's a problem that may or may not be real, is not a good service, and I don't know of any major marketer who's making plans based upon a new propellant. I really think they should look at improving the present propellants.

Question: Please comment on the amount of testing that is done, from a safety perspective, that is associated both with product safety as well as protecting yourself against tort law or liability law requirements. Also, are there some EPA representatives who would like to comment regarding this issue? How can we minimize our future liability?

Ted Wernick: Let me try to answer this the best way I can. I have been a toxicologist since 1956, and I have never worked for a company that has asked me to test a product to assure that we wouldn't be sued. I was always given the assignment to make sure that our products are safe for the people that manufacture them and safe for the people that use them. So as far as conducting a test to protect myself from liability, I have never designed or conducted a test for that purpose. The final responsibility of toxicologists is to assure the safety of our products.

Jim Weigold: I find it hard to believe that EPA would be able to tell anyone that they will be immune from suits.

2.10 TED DAVIS

Acting Assistant Director, Division of Air Resources
New York Department of Environmental Conservation

New York Regulatory Activities

Representatives from New York really appreciate the opportunity to share information at this type of symposium. To start with, I want to explain how a consumer/commercial solvent program got into the N.Y. state implementation plan. As you may know, the Clean Air Act Amendments of 1977 required a two-step approach for non-attainment areas. A plan was submitted for ozone in 1982. The wording of those programs that could be implemented were intended to result in some ozone reductions, but they did not demonstrate attainment of the ozone standard. Unfortunately, the EPA proposed to disapprove that plan in 1983, so we prepared another plan in 1984 that included five extraordinary measures. Those were measures that went beyond what we and the EPA believed were reasonably available. These measures included stage two gasoline station controls, reasonable available control technology on small sources, auto body refinishing controls, controls on architectural coatings, and lastly, controls on consumer/commercial solvents. However, in submitting that plan, New York put some conditions on it. First, we requested that the EPA publish its proposed Stage II control technology guidance document. It was released in a draft form in 1979. Second, we asked that the EPA get the oxidant model working, so that before any final decisions are made, we can predict what is expected to happen with air quality. Third, we wanted to assure tri-state consistency with New Jersey, New York, and Connecticut. None of these conditions have been fulfilled. In the current plan we assume that in commercial/consumer solvents, the 6.3 lb per capita number that was listed in AP-42 would be reduced to 4.0. That is roughly a 13,000 ton per year reduction.

After approval of the SIP, the EPA initiated the first of several SAIC studies. It was done during 1985-1986 and its purpose was to check the emissions and the emission factors that were being used for consumer/commercial solvent categories. This study covered New York, New Jersey, and California. The SAIC study confirmed the 6.3 per capita figure for the New York Metropolitan area, although the categories were somewhat different from those in the AP-42. A second SAIC study addressed emission reduction techniques. It was done in 1987 and covered only New York and New Jersey. The highest emitting product categories identified in the first SAIC study, air fresheners, disinfectants, and insecticides, were studied in more detail. This study considered such changes as reformulation, change in application method, substitution, and banning. The second study included no recommendations, and both New Jersey and New York concluded that the results were not usable.

Next we were sued in Federal court, with NYDEC and a few citizens' groups opposing the EPA and New York State. We were sued on the grounds that we had failed to implement four of the five extraordinary measures, despite the fact that the SIP never made a commitment to implement any measure until the other conditions were met. There was a similar suit in New Jersey. They had a few more measures that were not in the New York SIP; the only measure excluded was reasonably available control technology (RACT) for four small sources. The court order took over a year to negotiate, and it concluded that we would implement the Stage II program, the auto finishing program, and the architectural coatings program. We have developed regulations for those categories and implemented them.

However, we dropped all the other VOC programs in order to get them done. So even the small source RACT program fell by the wayside. We also agreed to implement part of the consumer/commercial solvent regulation for the three categories identified in the SAIC study. The Part 235 regulations cover air fresheners, disinfectants, and insecticides and require product registration, a complete study, and full compliance by January 1, 1997. More specifically in the registration area, it applies to all VOC-containing products in the three categories, and the registration had to be completed by September 1 of this past year. Registrations are slowly trickling in, and we have about 300 companies and 3,000 products registered thus far.

The registration process also required a commitment to initiate a study. If there was a consortium of manufacturers that represented 75% or more of the volume in the three categories, then they could agree to conduct a joint study. Studies must be approved by July 1 of 1990. The rule also required that all the study protocols be submitted for approval by the 1st of January, 1990. CSMA will submit a study protocol on behalf of at least 75% of the volume. If a product is not registered, there is a sales prohibition commencing January 1 1990. Shelf studies will probably be conducted to see if there are unregistered products. Manufacture date is not the issue; if a product is registered, that it can be sold. Each study had to be designed so that a 25% reduction in VOC emissions, in tons per year, not ounces per jar, would occur by 1997. The study had to commence no later than July 1 of 1990 and be completed by January, 1994. We expect to act on protocols in the spring, and have them completed by the first of July. For those companies that are registered but have unapproved or disapproved protocols, the sales prohibition would apply some time next summer.

We are still studying the consumer/commercial solvent categories. About a year ago, we held the Saratoga Workshop and concluded the Saratoga Agreement. It was an agreement among the NESCAUM States - that's all of New England, New York, New Jersey, and California, and Texas - that we would study various consumer/commercial solvent categories. Spray paints, all-purpose cleaners, hair care products, adhesives, underarm products, windshield washer fluids, and aerosol cans will be examined. Air fresheners, disinfectants, and insecticides are also included. The insecticides category is expanded to include all the pesticides. Schedules were assigned to these categories. New York will study the spray paint, the all-purpose cleaner, hair care product, adhesive, air freshener, disinfectant, and the pesticides/insecticides categories. New Jersey will also review the last three categories. California will conduct a study of underarm products, and Texas will examine windshield washer products. In the first year, and the first year is ending shortly, we hope to be in a position on hair care products, underarm products, and windshield washers, and to be able to make midcourse adjustments on the ones that were already in our regulation. Two years is the deadline for spray paints, all-purpose cleaners, and adhesives. The three-year study is for aerosol cans.

In general, without EPA action soon, it is expected that amendments to Part 235 will start covering other product categories. If the EPA wants to supersede the states in these areas, that probably should happen soon. Otherwise, we will be in the rulemaking process once again. It is expected that we will allow the same schedules in any new proposals as we have allowed in the past.

The study that New York is conducting is being handled by Pacific Environmental Services (PES). It began in October of 1988, and we expect a draft report in late August, 1990. This study covers six product categories identified in the first SAIC report as high emitters. The study is a complete inventory and reviews VOC reduction options. The study has been expanded to include other parts of New England, and a draft is expected in February, 1990. It will show the various options, what kind of emissions reduction could be expected from them, and give guidance on how to further regulate if necessary. The court agreed that insignificant sources emitting less than 100 tons per year could be eliminated from consideration.

In conclusion, it may be helpful to share the New York perspective. it was stated yesterday that the consumer/commercial category was 7% of VOC emission on a nationwide basis. In the New York metropolitan area it's 13% based on 1987 data, and expected to be 15% in 1990. This increase is not necessarily due to increased emissions, but rather because of reductions in other elements of the emission inventory. In 1970 the consumer/commercial category was 6% of the New York metropolitan inventory. The New York metropolitan area includes New York City, Long Island, and the two counties just north of the city. From 1970 to 1987 the total VOC inventory has decreased from 625,000 tons to 298,000 tons. A 55% reduction has occurred and there is discussion of a further 75 to 80% reduction. Programs have already been implemented for motor vehicles, industrial sources, and architectural coatings. These programs have been and are being implemented, and many are being reexamined. There is discussion of a stringent emission package to further reduce automotive emissions. Our conclusion is that reductions in consumer/commercial contributions to high ozone are an integral part of the solution. Whatever happens in Congress or with the EPA, it is hoped that existing State programs will not decelerate.

We have discovered that industry needs time however, and that the best solutions will come out of an industry/government partnership that will need time to develop. There are some technical questions that must first be addressed. The sampling methods for determining compliance, particularly from aerosols, have not been developed. An active emission inventory has not been developed. We need to know the role of VOC substitution before we can make decisions. Consumer satisfaction and consumer acceptability must also be assured. And finally, we have to be very careful concerning the environmental and health consequences of what we propose.

Question: You said that the New York City area has had a 55% reduction in their VOC inventory since 1970. What is the resulting ozone drop?

Ted Davis: The design value for ozone has maybe gone done by approximately one-third. For a rule of thumb for the New York area, for every percent VOC inventory reduction you get about 1/2 of a percent decrease in ozone.

Question: In the development of a mandate for a reduction study, how do you address the formulator who has a product that contains 100% VOC, and that VOC is the active ingredient?

Ted Davis: From our perspective, if there is still 100% VOC content but consumers could use less of the product to get the desired effect, that would still be considered a reduction in the amount of VOC emitted. This would still conform with the intent of the regulation, which is to reduce hot summer day and seasonal emissions. We are not looking at an absolute reduction in content, instead we are looking at a reduction in emissions.

Question: [inaudible]

Ted Davis: One thing not mentioned was that we would probably allow a reduction program in place of a study if somebody could demonstrate a 25% reduction in emissions.

Question: The 1987 SAIC study didn't provide any reliable information, and the 1985 SAIC study also had some significant problems in its inventory. I question the relevance of any data from the 1985 study. Even if the data were correct in 1985, there are major product categories in existence now that were barely created in 1985. It's a constantly changing marketplace. In addition, the 1985 SAIC study was based on no accurate formulation information, very little accurate sales information, and regional differences in the use of the products were not taken into account. The best data in the study may be within an order of magnitude.

Ted Davis: It's still the best study we had, it basically started the ball rolling.

2.11 EDWARD HEIDEN President
Heiden Associates, Inc.

The Socioeconomics of Regulating Consumer Products

Heiden Associations was retained by CSMA to conduct an economic impact study of the cost of VOC removal for underarm products in the state of California. The products discussed at this symposium are in everybody's closet, bathroom, garage, and kitchen. The whole household lifestyle could be affected. No comprehensive figures on the total amount of consumer spending involved have been published yet but it will be considerable. For just four categories, hair spray, antiperspirant/deodorant, shaving cream and fragrances, shipments were worth $2,000,000,000 based upon 1980 data. These figures are more than double that now for shipments, and consumer spending is a 2- or 3-fold multiple. Many products are involved, including, personal products which have already been mentioned, household products, waxes, starches, and laundry products, furniture polish, veterinary products like pet sprays, paints, insecticides like flying insect sprays, automotive products, cleaners, and even miscellaneous products like artificial snow and bird repellant. There are very few regulatory possibilities, and many of them will, in one form or another, require suppliers to reformulate their products, particularly focusing on aerosols. This may also be true for non-aerosol products, such as antiperspirants and deodorants. The impact will be large in terms of costs for dealing effectively and efficiently with this regulation.

The following is a review of the costs and some of the impacts that are likely to arise. There are two kinds of costs: costs on businesses and suppliers, and costs that affect consumers. There are several categories of business costs and many of them are quite large. The first is capital costs that reflect abandonment of line, or conversion of an existing aerosol line to a non-aerosol line for manufacturing. This is a fairly large capital cost item and will affect many of these products.

Second are R&D and marketing costs associated with reformulation of each type that doesn't need particular content specification. There are a good many of these types of costs, and they are large and more exhaustive than you might imagine. They include such things as in-house laboratory testing to determine the technical feasibility of product formulation and reformulation; packaged screening studies to meet reformulated product profiles; adjustments in container size and type and valve delivery rate; small-scale animal toxicity studies; large-scale process testing; process compatibility; plant manufacturing test runs, and so on. In some cases, large-scale toxicity and human irritation studies must be conducted. Safety and efficacy studies; mass production scale-up, consumer acceptance studies; and development of advertising and marketing strategies, are required. In-house marketing staff and out-of-house advertising agencies will be affected in having to conduct controlled distribution test marketing, develop new lithography mechanicals, and conduct engineering assessment of equipment needed for full-scale manufacturing (including plans for changes and plant and manufacturing line configuration). In addition, decisions must be made in management analysis as to whether or not to introduce the new product. The key thing about many segments of the consumer products industry, including some of the most important ones, is that there are dozens of combinations of products. Within a single line these combinations are based on variations in product size, product type (whether it's a standard or a non-standard product, for example), the type of container, and appearance. These are marketing costs that have to be applied in the context of a large number of product combinations. Thus, R&D marketing costs are likely to be extremely significant.

The third type of cost is the replacement cost for the hydrocarbon propellant to create an acceptable non-VOC alternative. In connection with the California study, one major manufacturer indicated that, compared to an upcharge in the propellant cost estimated at about $0.26 per pound for hydrocarbon, the upcharge for developing an acceptable VOC alternative would be $1.00 to $5.00 per pound. It was also estimated that this would add, on the average, between $.33 and $2.13, using adjustments for weight and content of container in the underarm area, to the final consumer cost. So replacement cost is likely to be substantial.

The fourth category of cost involves changes in distribution requirements. One of the things found in the California study was that firms would find it very difficult, if not impossible, to respond on a California-only basis in terms of aerosol reformulation for underarm products. Many of the survey respondents, covering the majority of output for the underarm antiperspirant and deodorant segment, indicated that they simply would not be interested, and from an economic standpoint would not be able to separately distribute products to California. Under separate state-by-state regulatory requirements a new set of costs would be added for distribution, storage, and inventory costs. New transportation requirements, changes in storage space requirements, changes in company owned warehouses, separation of inventories, and the need for clerical staff to monitor distribution and direct wholesale and retail accounts, will all be additional costs.

The fifth category, and an extremely important one, is the economic loss that is associated with capital that will no longer be productively employed. This includes the loss of aerosol cans, valves, plastic components, ingredients, concentrates, propellants, and the loss of capacity to produce those. These are not just hypothetical losses, this is capital that is in place and contributes directly and indirectly to the gross national products. This is a very significant loss, and it is recognized as such in the impact work that was done in connection with the CFC aerosol reduction and ban. The costs will amount to well over a billion dollars if you total up all of the lost processes. Obviously, we don't have the data or the scenarios yet, but this is going to be an extremely significant category of cost.

This is also a real economic loss as measured by and reflected by job loss and in reduced capacity. There is also a potential cost in terms of foregoing alternative research opportunities. A good deal is heard about the need to develop an acceptable alternative to hydrocarbons. No one at this stage knows how much, but that effort represents lost opportunity costs in terms of other kinds of R&D efforts that could have been undertaken. This could be an extremely significant component.

Turning to consumer costs, what we know from the cost increments that will occur from the business standpoint is that consumers are going to pay significantly higher prices for aerosol delivery, if they're going to have them at all. Some firms in our California survey said they would simply respond by cutting out the production of aerosols and turn to non-aerosols. Those firms that stay with aerosols will be reformulating them, and costs will be reflected in significantly higher prices for consumers. Also, we can expect significantly higher prices for non-aerosols. Although this is not as definitive, there might well be a demand shift toward non-aerosols. There will again be some cost of reformulation involved, and both of these factors will tend to increase the price of non-aerosol.

Increased prices for both aerosol and non-aerosols with take place against the backdrop of some equity considerations. One issue that is extremely important to an economist, in addition to losses, efficiency, and direct cost, is the distributional equity of costs and economic arrangements dealing with a regulation. Many affected consumers in attainment aréas will be forced to pay for these costs, but will derive no benefit. Regulatory approaches that are designed to address this issue, have their drawbacks. This equity issue is one of the key issues. It is a very difficult problem and one that is of enormous importance in the regulatory impact area.

Another dimension to be considered with aerosols is the issue of their convenience. Why do consumers like them? A good many consumers, we found in our California study, are real fans of aerosol delivery. Practically 25% of total underarm products are in the form of aerosols, and this had been a fairly stable percentage over time. We did a small scale survey, not a statistical one, of California consumers with respect to why they liked aerosols and why they continued to purchase them even though they have significantly higher price per application than non-aerosols. The responses included quicker drying time and allergic potential to non-aerosols. A number of responses involved possible clothing stain problems. So underpinning the tendency in the marketplace to vote with the pocketbook for aerosols is the issue of convenience. For many of these products, the issue is functional usefulness as well as convenience. A survey of users of these products might find a high concern for usefulness to go along with the convenience. But again, we don't have specific data in this area, but we are talking about a loss of usefulness as well as a loss of functionality.

The last issue which we found in the California study was that if regulations occurs state-by-state, some of the consumers in our survey indicated that they might take advantage of availability in other areas to bring aerosols products back into California. This issue can be troubling in terms of achieving goals of reduced emissions. Roughly 40% said that if they were somewhere else and had the opportunity, they would purchase an aerosol can that was banned in California.

There are other impacts as well that cannot be looked at as rigorously. First there is the impact on small business which is one that cannot be neglected. This impact is part of the fabric in the loss of economic value for the upstream vendor industry that we talked about earlier. In particular, there is a group of individuals called contract fillers who fill the requests of the formulators. There are a lot of these contact fillers out there, and a lot of them have very specialized, one-on-one relationships with formulators/marketers. They have been, if you will, in commercial marriages for many years. Fillers for aerosol underarm products specifically mentioned that there is a very strong possibility that they would be forced out of business. The applicability goes well beyond underarm products in this case. An impact on employment is also likely.

There are other impacts that could be important such as possible changes in the competitive structure of this industry. Changes in the competitive role that contract fillers play may possibly change the competitive fabric and market relationships in them. Possible loss in trade advantages may also occur for some products. It could well be that regulation will create a situation where these products become non-competitive, thus reducing our price advantage relative to countries that don't have these requirements, and changing the terms of trade. That is a policy decision that would have to be taken into account in making regulatory decisions.

The point is that there are a number of very important impacts. We can't possibly know what they all are or could be.

Any study of the potential regulatory agenda for reducing hydrocarbon emissions has to take a look at the candidate for that regulation from the standpoint of economic impact as well as from the standpoint of ozone reduction. An emissions inventory for purpose of rational decision-making is not enough. It must be accompanied by an economic inventory or an economic impact assessment.

Question: When you were mentioning the costs, it struck me that there would be significant loss of jobs, sales, and business opportunity associated with excess industry capacity. If you're talking about modified products, reformulated products, it's not as if those products are necessarily going to disappear or a whole gamut of products would disappear.

Ed Heiden: No, it's certainly true that you would have new value added, in the other sectors, but of course, you may have that at significantly higher cost. The point is however, that you will be losing what used to be a source of employment and economic value whose capacity can not be converted. If this was convertible capacity, you would certainly take that into account, although you'd still have the extra resource cost of conversion. But we're talking about capacity that could not potentially be earmarked for substitutes in the event of severe restrictions on aerosols. That would lead to permanently lost GNP.

Brock Nicholson: I think that in that one example one might suggest that you'd lost some of that, but (1) that doesn't necessarily represent the prospects the industry as a whole across the country, and (2) to a certain extent, those employees and that capacity are certainly viable there for conversion, for new opportunity, and for new products not strictly in the aerosol can area.

Ed Heiden: It is one thing to say that these people could find new employment and it is quite another to say that a part of our country's gross national product is permanently lost. There are enormous friction and dislocation costs in making transitions for capital. I am sure it can be done, and that's why one of the costs I have not talked about was the cost of lost employment. The capital specifically designed for aerosols in most cases can't be converted in terms of the upstream supplier capital, although the lines can be converted from the marketing and formulation standpoint to a great extent. One of the participants in the California study indicated that they could not convert their aerosol line and that they would have to abandon it; but generally, the conversion was at least a technical possibility. We're talking about the upstream suppliers and that's simply lost GNP.

Comment: [Bob Hangebrauck, EPA]. It seems that we need to look at this whole picture as an evolutionary kind of thing that is going to occur anyway. Within our development of new products, existing products change with time. The names are going to change, and at the same time, new products are being brought into the marketplace. I think we're talking about environmentally attractive evolution. I am used to seeing a label on products which says "new". A lot of times it's the largest lettering on the product. This gives us the idea that there is constant change going on in the consumer area with respect to products.

Another comment on the aerosols; I think there are obviously alternative propellants and alternative dispensing mechanisms that people are thinking about. Considering that worldwide we are manufacturing something like 8 billion of those units a year and they are causing disposal problems, maybe we should think about innovative approaches for dealing not just with the problem discussed here, but other aspects of it as well.

Ed Heiden: Those are good comments. The goal you stated, to make sure that commercial development is seen as part of the normal process of the ongoing development of innovative new products, is a worthwhile goal. The point is, however, that most new product development occurs against a calculus that it is going to be worth while in a consumer payoff sense, that there will be a market for it, and that the benefits will exceed the long run cost of the investment. That is a good principle to apply to this type of regulation as well. Certainly you don't want to impose these costs unless they will have meaningful benefits.

Question: The set of concerns that you talked about in regulating in this area, the desire to minimize vulcanization, to minimize costs to industry and consumers, and to assure compliance, are the traditional array of regulatory approaches; prescriptive command and control, fees, market permits, whatever. What kind of advice would you suggest as a way to regulate in this area, where obviously it is difficult for the Agency to know a priori all of the possible impact? What are the desirable features of different regulatory approaches?

Ed Heiden: Considering the basic costs and benefits of permitting, taxes, and command and control, these approaches should be examined. They have real implications for addressing some of the equity considerations that we've talked about. But, again, they also have their problems. I think it is very admirable to examine all the potential strategies and conduct a systematic assessment of them. I can't answer your question, however, because I have not given a lot of thought to it.

Comment: [Leonard Drell, Demert and Dougherty]. There seems to be no experimental verification for many of the allegations that have been made. It is very hard to show industry that a real benefit would occur, in terms of ozone diminishing, from banning aerosols. Hydrocarbon propellants have been lumped together, but the whole concept of VOC exaggerates the ozone forming potential of hydrocarbon propellants. It would be unfortunate for industry to make a large sacrifice with no real benefit to public health. The best course would be to experimentally verify some of these assumptions to convince both the public and industry that this is a worthwhile endeavor. Reducing ozone is very important, but the elimination of aerosols will not solve the problem. The attitude that hydrocarbon propellants should be disposed of ignores the possibility that they can be improved. But the government people who have spoken here show no desire to improve them. The problem requires a solution; it doesn't require unproven theories.

Jim Weigold: EPA and a lot of other people have been studying the issue of hydrocarbons for the past 18 years. There is an enormous body of data on these studies, and I would suggest that you contact some of EPA's researchers. The specific issue of how much reduction results from regulating aerosols is extremely difficult to estimate. There is strong feeling that reducing hydrocarbons will reduce ozone, but continued progress in meeting the ozone standard is going to be enormously expensive. Analysis that takes place should be comparative. The Clean Air Act does not allow consideration of costs in establishing ambient air quality standards. It only allows indirect consideration of costs in terms of the time needed to achieve the standard and for implementation of the programs achieve the standards. It is understood that this process is going to be enormously expensive and disruptive. If a strict cost benefit analysis were performed and the benefits were accurately determined, there might be some imbalance. But, while costs for this industry are certainly an important consideration, impact analysis has to include more than that.

2.12 SANDRA CHEN

Supervisor, Bureau of Engineering and Regulatory Development
New Jersey Department of Environmental Protection

New Jersey Regulatory Activities

The pathway that led to New Jersey's regulation of volatile organic content of consumer products began in 1982, as New Jersey finalized its submittal of revisions to the SIP for the attainment of the National Ambient Air Quality Standard for ozone. New Jersey found that it could not attain the necessary reduction for volatile organic emissions through reasonably available control strategies alone. To be able to demonstrate attainment of the ozone standard by 1987, the State had to resort to extraordinary measures. One of these extraordinary measures was reducing the emissions from consumer or commercial solvents. In the revised draft SIP submitted to the Federal EPA, New Jersey proposed to study the feasibility of implementing certain extraordinary measures including controlling emissions from the use of consumer solvents. However, during New Jersey's negotiations, the EPA maintained that a commitment only to study the feasibility of these measures was insufficient. The final version of the SIP document approved by the EPA on November 9, 1983 described consumer/commercial solvent use as a source category which includes volatile organic emissions from a variety of products, including toiletries and cleaning agents. The Department committed to a strategy of achieving emissions reductions within this source category by developing appropriate regulations concerning reformulation or product substitution. Certain qualifying language preceded this commitment in the text such that if air quality improves, or if more reductions than anticipated are achieved through the reasonably available control strategies, the magnitude of the emissions reductions necessary from extraordinary measures would be reduced. In such a case, New Jersey would seek a SIP revision.

The commitment to adopt extraordinary measures including regulation of consumer products was made "until and unless such revisions are approved by the U.S. EPA." Also, regulation of product content was one of a number of measures the New Jersey regulators felt could best be addressed by the U.S. EPA at the national level. Most consumer products are marketed on a regional or national basis, making regulation by a broader jurisdiction rather than the State more logical. All these factors left a sense of ambiguity at least in the minds of New Jersey regulators as to whether they were in fact committed to regulating emissions from consumer product use. And in any case, it was not a question that needed to be settled right away since the schedule in the 1983 SIP document did not require adoption of regulations implementing extraordinary measures until January 1, 1987.

New Jersey did, nonetheless, clearly recognize its obligation to carry out studies to establish the technical basis for regulating emissions from consumer products. It carried out this obligation by contributing monies, as did New York and California, to help support a two phase consultant study conducted by the U.S. EPA Region II. The first phase of these studies was undertaken in 1985 and set out to determine if there is a potential for emission reductions from regulating the consumer product category. A Phase I report entitled "Photochemically Reactive Organic Compound Emissions From Consumer and Commercial Products" was completed in November of 1986. This study reported that tens of thousands of tons of volatile organic compounds were being emitted in New Jersey each year through product use. Further, it found that a preponderance of these emissions emanated from the following six consumer and commercial product categories in addition to architectural coatings adhesives, hair sprays, all purpose cleaners, insect sprays, air fresheners and disinfectants, and car polishes and waxes. The second phase of the study focused on two of these six categories: air fresheners and disinfectants, and insecticides. A technical report, "Control Techniques for Reducing Emissions of Photochemically Reactive Organic Compounds from Consumer and Commercial Products," was issued on September 30, 1987. This report recommended banning the use of ozone precursors in the manufacture of consumer products as probably the most effective control strategy. It noted that such banning might serve as an impetus for industry to pursue other strategies such as reformulation, changes in application method, and development of substitute products.

New Jersey regulatory focus had been on support of these two studies. Despite the schedule in the SIP ruling that implementation of extraordinary measures would be proposed by January 1, 1986, no rule had as yet been drafted. On November 14, 1986, a coalition of environmental groups, led by the American Lung Association of New Jersey and the Natural Resources Defense Council notified the New Jersey Department of Environmental Protection and the U.S. EPA of its intent to commence a civil action against the state for its failure to carry the SIP commitment. On January 28, 1987 this coalition brought suit to compel the state to implement Stage II gasoline vapor recovery and six extraordinary measures including control of emissions from consumer products. On September 24, 1987 the U.S. District Court Judge ruled in favor of the plaintiffs, and on November 19, 1987, ordered the State of New Jersey to act to adopt the seven measures in accordance to the prescribed stringent timetable. New Jersey was ordered to adopt regulations to control emissions from consumer solvents by December 30, 1988.

New Jersey acted expeditiously to carry out the Federal court order. Regulatory development work on the consumer solvent category was combined with the regulation of the volatile organic content of architectural coating. A combined rule NJAC 727-23, otherwise referred as Subchapter 23, was proposed on August 15, 1989. The proposal took the strategy of establishing maximum content limit and concentrated on the two product categories focused on in the second Phase of the U.S. EPA Region II consultant study. The proposal prohibited anyone from selling, offering for sale, using, or manufacturing for sale within New Jersey any air freshener or consumer insecticide which did not conform with stipulated VOC content limits, and it set forth a 3-step implementation schedule, with a more stringent VOC content limit being imposed at each consecutive step, for both air fresheners and insecticides. The VOC content of regulated products was to be limited to 50% in 1990, 25% in 1992, and 5% in 1994. The intent of the phased-in approach was to allow manufacturers to reformulate their products, or to develop substitute products or alternative modes of application for their product. The proposal also required product labeling and recordkeeping, and spelled out the department's authority. The intent of the labeling section was not only to facilitate enforcement also to allow informed and environmentally conscientious consumers to choose products with lower emissions potential. The products registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) were exempted from the labeling requirement as the labels of the products registered under FIFRA could not be changed without prior EPA approval. The intent of the recordkeeping section was to create a paper trail from the retailers to the distributors and back to the manufacturers which could be retraced by enforcement officials. The inspection rights to the department were included so that affected retailers, distributors, and manufacturers, would be aware of the department's authority and of their obligation to assist and not hinder or delay the performance of any inspection.

Voluminous comments were received on this proposal. As the department studied the comments, it recognized the validity of the issues raised by a number of commenters. The department recognized that there was uncertainty as to the availability of alternative products, particularly for all types of insecticides. The absence of a detailed inventory, compounded by the reluctance of manufacturers claiming confidentiality of information and trade secrets, undermines confidence with regulatory assessments of the proposed rule's effect. Nonetheless, the underlying premise of the rule, that emissions from solvent-based products contribute to New Jersey's overall emissions, could not be doubted.

Subchapter 23 was adopted on January 26, 1989, and was published in the February 1 New Jersey Register. Because of the uncertainties associated with the technical basis of the rule, the version adopted was less comprehensive, less stringent and less burdensome on the regulated community than the original proposal. Consumer insecticides were not made subject to the volatile organic substances (VOS) content limit or labeling requirements. Subchapter 23 did, however, establish required documents of VOS contents in consumer insecticides shipped for use in New Jersey. Only the 50% VOS content limit for air fresheners was adopted. In addition, retailers of air fresheners were exempt from recordkeeping requirements. In order to make certain of the architecture coatings standards in this rule were consistent with New York, the department undertook immediately following the adoption of Subchapter 23 to propose amendments to it. These amendments appeared in the

New Jersey Register on May 1 of this year and were adopted on October 16, 1989. These amendments affected primarily the architectural portions of the rule; however, the definition of air fresheners was amended in response to comments to explicitly exclude products for use on the human body, such as perfumes.

To ease the burden on manufacturers who had to contend with the use of differing terminology and different jurisdictions, the changes also allowed other terms such as VOC or PROC to be used in labeling to refer to a product's volatile organic contents. The term normally used in New Jersey is VOS. And the unlimited exemption of private products subject to a fifth rule was deleted.

In June, during the public comment period for these proposed revisions, the department received a petition for rulemaking from over two dozen New Jersey paint retailers requesting that the rule be further revised to include a grandfather clause for architectural coatings. The department granted this petition, thus setting into motion the development of a second set of revisions. In lieu of the recordkeeping of provisions previously promulgated, the department is proposing to require manufacturers and distributors to attest on the invoice, bill of lading, or other shipping document to the distributors or retailers receiving the shipment if the product is in compliance with Subchapter 23 requirements. And also, in lieu of only manufacturers of consumer insecticides being asked to document the VOS content of products sold in New Jersey, all manufacturers of consumer products containing VOS sold for use in New Jersey are to be required to maintain records indicating the type and quantity of products sold, their VOS content, and the number of units sold. Manufacturers are to report this information upon request to the Department.

Also, the intent of this provision is to make accessible to the department a valid database as it proceeds with future consumer product regulation. This second set of proposed revisions to Subchapter 23 was published just last week on November 6th, in the New Jersey register. Public comment on this proposal is invited. The deadline for comment is the eighth of December. I encourage any of you who wish to do so to submit comments in writing, or in person at the public hearing scheduled for December 5th in Trenton, New Jersey.

New Jersey and many other states have not yet come into compliance with the National Ambient Air Quality Standard for ozone. Further reduction of the emission of ozone precursors must inevitably be an objective for air pollution control programs in states such as New Jersey for at least the next decade. This ensures that reducing the emission of volatile organic substances from products will not be overlooked by regulatory programs in years to come. The steps that New Jersey has taken to date toward the regulation of product emissions are clearly just the beginning. There is more information to gather. There are more emission reductions that may be obtained from the air freshener product category and there are more product categories to address. There are products used in commercial activities, as well as those used by consumers to consider. Also, there remains a lot of thinking to be done as to the appropriate control strategy. Consumer products are one emission category in which the use of economic incentives and disincentives may be an appropriate approach. It may be more socially beneficial to allow market forces, rather than the more inflexible product VOS content ban, to dictate which products will be forced out of the marketplace. As New Jersey contemplates future consumer product rulemaking, it does not believe it will be proceeding in isolation. New Jersey is committed to working with other states to form a common regulatory strategy. New Jersey is mindful of the initiatives being undertaken in California. The EPA, as the calling of this conference attests, is now also taking steps to act in the consumer product arena. The new Clean Air Act Amendments, if adopted, would make regulation of product emissions a national initiative.

As a closing remark, I will comment on the provision for federal preemption of consumer product regulation and the Administration's Clean Air Act bill. While New Jersey believes that the U.S. EPA should take the lead in regulating consumer products nationwide, we also believe that there should be no preemption of state rulemaking. More severe regional or local ozone problems may require some states to be more stringent than the EPA. Also, state rules can test innovative strategies, which could help the EPA in its efforts to regulate this extraordinary VOC category.

Question: I think that the opposite is true regarding your last statement about preemption and the state of New Jersey's position that they should have their own regulations. The ozone problem in New Jersey is related to the problem in New York City and Philadelphia. I don't see how any regulations which relate to the State of New Jersey are going to affect the overall inventory of a region which goes beyond the state boundaries. The New Jersey situation is a classic illustration of the preemption issue.

Sandra Chen: The problems of the Northeast corridor are clearly not going to be solved by the actions of any one State. The actions of any one State can contribute to diminishing these problems, but the most effective strategy is for all the states in the corridor to work together in a common and cooperative fashion, and this is certainly an objective we would like to see achieved in New Jersey.

Question: New Jersey's proposed rules allow manufacturers to ship products containing VOC out of state, but manufacturers cannot ship these products into the state. It seems that you're just pushing the problem back into the Northeast corridor.

Sandra Chen: Our jurisdiction is as a State agency and our mandate is to protect the air quality of New Jersey. This is what we have the authority to do. We would welcome similar actions in neighboring states, but we can only act to mitigate this problem in New Jersey.

2.13 MICHAEL KOSUSKO

Air and Energy Engineering Research Laboratory
U.S. Environmental Protection Agency

EPA Research Toward Reduction of VOC Emission from Consumer Products

The EPA's Air and Energy Engineering Research Laboratory (AEERL) is responsible for air pollution control research in the Office of Research and Development. In particular, the Organics Control Branch has the responsibility for ozone non-attainment, air toxics from organics, and woodstove emissions. There are a number of research programs ongoing in the Branch, including some concerning add-on control technologies. I'm responsible for stationary area sources of VOC and how they can be reduced. The funding for the program has been $300,000 over a three-year period for all area sources and consumer products.

The first stage in our current program is to gather information about consumer products and evaluate emission reduction strategies. AEERL will be supporting New York State and NESCAUM in gathering more information about emissions in the Northeast, and will continuously monitor California activities. AEERL was also involved in the planning of this symposium and gathering much of the industry information.

The other part of our program involves source-specific research. A report on aerosols was prepared and is currently being reviewed by CSMA and other industry representatives. Once these reviews are complete, we will decide whether or not to publish the report. Some concerns expressed have to do with the reliability of the formulation data in the report and the interpretation of market data to yield a true emissions inventory. Accurate emissions inventory data are very important. Another question concerns the loss of effectiveness in changing from aerosols. If we go to a different product form, is that really going to make a difference in the amount of VOC emitted? The same question arises with changes in formulation, especially once you take into consideration consumer use patterns and the effectiveness of the product. The second source-specific research project has to do with charcoal lighter fluid emissions and the potential for emissions reduction. This is a small source, but emissions can be eliminated almost entirely by use of alternatives. Evaporative and combustion emissions from charcoal lighter fluid account for about one-tenth of a percent of the VOC inventory. The alternatives may involve replacement of charcoal altogether or replacement of only charcoal lighter fluid by using electric starters or chimney starters (where you mount the charcoal over a screen and use a natural draft and a piece of newspaper to light the charcoal). Of course, there are other alternatives that have to do with using solvents to get them started. We also have a very small effort (in the range of about $25,000) going on right now to try to identify existing methods for testing the VOC content of products.

The plans for the current year are to finish the ongoing work, and prepare for next year's projects. The EPA administrator took 2% of the R&D funds for fiscal year 1991 to work on pollution prevention type projects, rather than add-on controls like carbon adsorbers or catalytic incinerators at the end of a stack. Pollution Prevention is concerned with changing formulations and changing process methods to reduce the amount of emissions. Our initiative Demonstration of Emerging VOC Area Source Prevention Options is one of probably 100 proposed projects. The laboratory was funded for this effort for the fiscal year 1991 at the level of $1,000,000. There is potential for funding in fiscal year 1992.

One important issue in the pollution prevention initiative was to have a broad base of support partners in the effort. AEERL is the lead laboratory or the lead agency, but others have a part to play in the initiative. The initiative is split essentially into two parts, with funding equally divided. The first part is demonstrating the viability and benefits of substitutes for volatile organics. This is an interesting effort, because it's going to be jointly funded by our Laboratory, South Coast Air Quality Management District, and an unidentified industrial partner, at a level of about $250,000 per year per group. The proposed activities will look at alternatives to aerosol propellant packaging and whether they will have an effect on VOC emissions, and surface coating-free materials. The significance of surface coating-free materials is that, if you can avoid coating a structure on a regular basis, you can cut down the amount of emissions that come from that process. If you have a surface that doesn't need to be coated at all, you can reduce emissions even further. For example, a few years ago U.S. Steel came out with girders that rusted in such a way that protected them from the need to be coated. The other participants in this part of the work are South Coast Air Quality Management District, Region 9, California ARB, and OAQPS.

The second part of the prevention initiative deals with consumer institutional product VOC prevention options. This work involves development of information on organic emissions from consumer products.. The background engineering analysis is to identify the key players in the marketplace. We plan to get a better inventory, have more workshops to identify pollution prevention options, and examine technical/institutional barriers to making changes to products. An example of a technical/institutional barrier might be found in the stratospheric ozone program in the use of Freon refrigerant in automobile air conditioners. Until a few years ago, there was no way to certify the quality of recycled Freon, and for this reason the automobile industry would not honor their warranties when recycled freon was used. The

AEERL identified this problem, set up a work group, and developed a test method for recycled automobile refrigerants. Now there is a standard for recycled Freon, and there is recycling equipment in the automotive industry. We need to have this type of workshop to work on the problems and the barriers that are being identified today so that we can go forward.

In conclusion, the purpose of our program is to gather information about the entire consumer products industry and focus on emission reduction options for specific products. Secondly, to date, our research efforts have been pretty small, but we expect them to grow in 1991. We have identified several areas of uncertainty, a lot of them came directly from CSMA's response to the aerosol report, and a lot of them have been identified here at this Symposium. The consumer products industry is extremely complex, and we're going to need to cooperate with industry to make gains and to come up with an attainable and verifiable VOC reduction strategies and goals. Cooperation between industry and government is needed to identify the barriers to making changes and to identify opportunities for pollution prevention. Some of these barriers may be greater than one company alone can handle. We would like to work with industry, with CSMA, and other trade associations to define what government research may be beneficial. And finally, we need some input on how we are going to focus our research in consumer products to make a difference.

3.0 WORK GROUP SUMMARIES

3.1 PERSONAL CARE PRODUCTS

The Personal Care Products Work Group focused its discussion on four major points:

1. Current inventories of VOC emissions from the use of consumer products are inaccurate and unreliable.
2. Future inventories should be compound-specific and consider the ozone formation potential of VOC's used in consumer products.
3. Discussions of regulatory approaches is premature. Regulatory approaches should be tailored to specific product categories.
4. Control measures selected for consumer products must be accompanied by a demonstration that reductions in ozone will be achieved.
5. Regulation of VOC's must be equitable both across VOC source categories and within specific consumer product categories.

3.1.1 Development of an Inventory Database

Industry representatives felt strongly that there is not currently a sufficient database upon which the EPA can base a regulatory program. A chemical specific consumer products VOC emissions inventory should be the first priority for regulatory development.

There was consensus that the inventory protocol should be jointly developed by the EPA and industry, and then quality assured. Industry would be happy to work with the EPA and its consultants in order to insure that the inventory is done with a full understanding of the affected industry. The aerosol industry uses only three hydrocarbons as propellants, and there are only five producers of these propellants. The participants from the aerosol industry felt that their industry would be happy to work with the EPA by giving them ozone formation data on each of these three hydrocarbons. Information on product formulation is available from the Cosmetic Division of the federal Food and Drug Administration for many consumer products.

The work group participants also felt that clarification of the goal of regulation is needed: is the EPA intending to focus on the reduction of VOC emissions from the use of consumer products, or on the overall reduction of tropospheric ozone? This issue would have bearing upon how an inventory is executed, as well as upon regulatory strategy in general.

3.1.2 Prioritization of Solvents

Industry feels the need to demonstrate to regulators that all VOC's are not the same; different solvents have different potential to contribute to ozone formation. Many participants also had difficulty with the EPA's definition of a "VOC", feeling that it is too broad and leaves formulators no solvents with which to work. According to the EPA's definition, unless a product is water-based, it contains some solvent and consequently emits some VOC. According to industry representatives, many personal care products would no longer be effective without some solvent content.

In the case of aerosols, propellants are liquified gases and are virtually all solvents. The group also pointed out that many alternative (i.e., non-VOC) propellants are likely to create new emissions problems or contribute to other existing air pollution problems. It was the opinion of some participants that hydrocarbons are the most acceptable propellants and do not contribute significantly to air or water pollution.

The group suggested that the inventory of VOC emissions be compound specific and include some consideration of each organic compound's relative ozone formation potential. Participants felt that it is important for the inventory to include ozone formation values for each of the 50 most prevalent organic compounds in consumer products. All industry participants agreed that photochemical reactivity must be considered.

One industry participant suggested that the "80/20" rule may apply, in that a relatively small subset of products (i.e., 20%) may produce 80% of the VOC emissions. Focusing on the 20% would produce substantial reductions with less disruption to the industry as a whole.

3.1.3 Ozone Reduction

The group felt it important that any proposed control of consumer products include a prediction of the amount of ozone reduction it would achieve. The group considered market approaches to regulation, such as economic incentives and allotments, viable options; however, industry is not able to assess the merits of these options without an emissions inventory and an estimate of the ozone reduction that the EPA intends to accomplish.

In addition, there is strong concern within industry about having sufficient time and opportunity to adapt/change their products to accommodate regulation. A ban similar to the California ban on aerosol deodorants could be very disruptive to the personal care product industry if insufficient warning and preparation time were given.

Therefore, industry and government should work together to establish a reasonable attainment goal. Industry representatives feel that they can familiarize regulators with their production processes and, thus, ensure development of an attainable regulatory goal.

3.1.4 Control Measures

Participants agreed that product substitutions are feasible with some personal care products; for example, spray deodorants can be replaced with stick deodorants, which contain less VOC's. However, substitution is not possible with other products such as styling mousse or hair spray. Product design changes could also limit VOC emissions; for example, containers can be designed to release a pre-measured amount of spray with each application. The cost of this change could be high, however, and VOC emission reductions could be negated if the consumer repeatedly pressed the spray button. Consumer preferences and willingness to accept substitutes are an important consideration in finding product substitutes with acceptable market impacts.

3.1.5 Fairness in the Marketplace

Fairness in the marketplace should be a guiding principle for any proposed regulation. The regulatory approach should be tailored to specific product categories, providing for reasonable exemptions for products in which solvent content is essential. The equity (fairness) issue addresses concern over possible disproportionate effects (impacts) between (1) small and large companies, and (2) fair-share of ozone reduction burden.

3.2 HOUSEHOLD CARE PRODUCTS

The participants in the Household Care Products Work Group felt that it is too early in the regulatory process to provide answers to the nine questions posed by the EPA for this workshop. They felt it imperative that industry, States, and the EPA continued to work together in the future to answer some of these questions. Instead, the group chose to concentrate its current discussion on three areas:

1. Current research activities on VOC emissions from their products,
2. Evaluation of the regulatory approaches discussed in the morning sessions of the workshop, and
3. Steps the EPA should take next to gain a better understanding of VOC emissions from consumer products.

3.2.1 Current Research Activities

An industry consortium has been established in response to recent regulations (NY Rule 235) adopted by the New York Department of Environmental Conservation (NYDEC). The consortium has been charged with developing a protocol for the 25% reduction of VOC emissions from the following products: air fresheners, disinfectants, room deodorants, and insecticides. NY Rule 235 includes a four-year study period to develop this protocol. As of this date, the consortium has elected officials and a Steering Committee, and has approved bylaws. They have yet to establish technical committees to develop specific protocols.

The Soap and Detergent Association (SDA) is currently studying the fate of the volatile organic constituents in a number of consumer products to determine whether or not VOC content of consumer products equals VOC emissions. In the household care products category, many of the end use solutions which contain these products are disposed of down household drains, and end up at wastewater treatment plants or in septic tank systems. Preliminary study results indicate that a large percentage of household products that go down the drain are not emitted to the ambient air and thus will undergo biodegradation. Preliminary results from Phase 1 of the study, which evaluated light duty and heavy duty detergent products such as liquid dish washing and laundry products, should be available to the public by the end of 1989. The SDA believes the results from these studies will be broadly applicable to other categories of household products.

The Clorox Company is also studying the fate of VOC's in certain consumer products. They are currently conducting a study on the formation of volatile and non-volatile chlorinated organics from household bleaches. Clorox feels that VOC's may undergo other processes besides biodegradation and release to the air. Their study includes identification of interactions that may be occurring between the VOC's in the products and other materials in sewage.

Members of the work group also indicated that some reformulation and testing of new products is underway in response to recent State legislation. Some companies are either attempting to reformulate or are choosing to abandon certain products in the air freshener category in order to comply with recently promulgated NJ regulations.

3.2.2 Evaluation of Regulatory Approaches

3.2.2.1 Fee Structure--

The household care products group agreed that a fee structure is not a desirable option for this industry. There was concern that whatever fees were established would not achieve the desired goal of reducing VOC emissions, because industry and consumers would be willing to pay more for certain products containing higher percentages of VOC's.

3.2.2.2 Marketable Permits--

Marketable Permits were considered a better option than the fee structure; however, there are many issues to resolve. Participants encouraged the EPA to explore this option and provide the industry with more concrete ideas. One issue discussed was the need for an accurate baseline emissions inventory. The participants felt that an inventory is essential for gauging how well a regulation will achieve the desired goal of reduced VOC emissions.

3.2.2.3 Command and Control--

Participants felt that the consumer products industry has successfully dealt with a command and control approach in some individual States, and that, therefore, this would be the best approach for Federal regulations as long as they are based on an accurate understanding of the industry. The participants stressed that EPA emission reduction targets for the various product categories must be based on sound emission and use-pattern data. The participants suggested that industry and States should be involved in preliminary research to help determine what the appropriate emissions reduction targets should be.

3.2.3 Definition of VOC Content

There was an overwhelming consensus among the work group participants that the EPA's current definition of VOC provides little leeway for reformulation efforts, and must be narrowed down for the household products industry. Participants encouraged the EPA to include photochemical reactivity in their definition of "VOC" and to share the results of some recent studies on reactivity of various VOC's. Considerable discussion addressed a test method for determining volatility or vapor pressure of specific VOC's as they occur as components in consumer products. The following are three basic questions that the participants feel the EPA should address in defining "VOC" for regulatory purposes:

- What compounds should be covered by a definition for VOC for this industry?

- How are the various products containing VOC's used and disposed of, and how does this affect the amount of VOC's actually reaching the atmosphere?
- Can the VOC's be ranked based on photochemical reactivity; and can photochemical reactivity be taken into account in order to assess the VOC's impact on ozone formation?

3.2.4 Recommendations for Additional Study

The Work Group participants suggested that the EPA, working with industry, conduct additional research to accurately quantify emissions from consumer products, particularly in light of results obtained from the SDA study. Product usage practices and the ultimate fate of product organics in the environment should be considered. The participants felt that a two year study period would be adequate for quantifying consumer product VOC content, but not for defining and evaluating the impacts of the different products on ozone formation. The participants encouraged the EPA to conduct additional studies after the two-year period to establish the amount of VOC actually emitted to the atmosphere before deciding on the most appropriate regulatory strategy.

Following preliminary evaluation of the industry, the EPA should work with industry and States to establish an approximate reduction target for VOC emissions from consumer products.

3.2.5 Consistency with Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

It was the opinion of the Work Group that products regulated by FIFRA should be given special consideration under VOC regulations. The EPA should coordinate with other regulatory agencies and other offices within EPA, such as the Office of Pesticides and the Office of Toxic Substances, in determining appropriate time frames and regulatory requirements for developing new products. Registration of new products, product safety testing, and compliance with existing FIFRA requirements must be considered when establishing time frames for compliance with a VOC regulation. This becomes especially important when regulating products whose active ingredients are VOC's.

3.2.6 Consistency with Future Regulations

Industry also encouraged the EPA to try to anticipate other air quality issues that will need to be addressed in the future. There was concern among the participants that compounds identified now as suitable alternatives may be cause for concern later with regard to indoor air quality, air toxics, carcinogens, or global warming. Industry needs to avoid spending millions of dollars to reformulate products only to find that their new products are contributing to new air quality problems.

3.2.7 Industry and State Roles in the Regulatory Process

Both the household care products industry and States would like to continue to advise the EPA through workshops like this one throughout the study and regulatory process. It may be necessary to involve more technical people to address the more technical issues. Participants would like to continue to act in an advisory role to the EPA.

Participants also suggested that the EPA should work closely with the trade associations to gather information and industry input. The trade associations can collect necessary data for the EPA while protecting proprietary information; or they can direct the EPA to appropriate sources for information gathering. A close working relationship with the trade associations is essential for continued industry-government coordination.

3.3 AUTOMOTIVE PRODUCTS

3.3.1 Need for a National Inventory

The Automotive Products Work Group asserted that the primary issue for regulatory development is the need for a complete and reliable VOC emissions inventory for the consumer products source category. The group recommended development of a protocol for gathering VOC emissions data. The protocol should include use of existing databases such as SARA-313, NIOSH, MSDS, and State agency data bases, as well as existing industry data such as market surveys, product formulation, and industry-sponsored studies. Industry would be willing to cooperate and contribute to an inventory if they were included in development of the inventory protocol.

The inventory should be species specific, or at least specific to solvent use categories, and would establish a baseline against which to measure future emission reductions. Furthermore, it must be determined whether product VOC content or VOC emissions are to be measured. It was the group's feeling that the two years allotted by Congress for an industry study are not enough; four years, as suggested by Dr. Ralph Engel, would be more appropriate.

3.3.2 Prioritization of Solvents

All of the industry representatives agreed that ignoring relative volatility or photochemical reactivity is not a realistic or productive approach to regulation. Two types of ranking or categorizing of products were discussed: first, participants felt that solvents or groups of products should be ranked according to their propensity to emit ozone forming VOC's. Certain products could then be targeted as primary contributors to ozone formation due to their high ozone forming potential. Secondly, products that cannot be formulated without substantial amounts of VOC should be identified, and the emissions involved quantified. The industry representatives feel that certain products, such as antifreeze or carburetor cleaner, cannot be effective without solvent content, and must be exempt from regulation or at least treated individually.

Elasticity of consumer demand must also be determined for classes of products. There are certain consumer products whose contents and/or cost can readily be altered in order to meet ozone compliance, but other products meet essential consumer needs and cannot be reformulated. For example, VOC's in hairspray would be considered more expendable than those in carburetor cleaners or antifreeze.

The EPA representatives responded to these points by reiterating that a market approach to regulation is intended to address just such issues, allowing industry to respond to regulations in the most effective way. The EPA cannot possibly be as familiar with the intricacies of the market as are those involved in the industry. Approaches such as fees and allotments set limits within which the industry can apply their more complete understanding of the market in complying with regulations.

In any case, the industry representatives stated that, in order to know where to focus their current R&D efforts, they need an indication of the degree of VOC reduction planned by the EPA and the time frame for coming into compliance.

3.3.3 Industry Response to Regulatory Alternatives

The potential for regulation to inhibit innovation and industry growth was also of concern to the industry participants. Allotments can create barriers to entry if larger companies monopolize available allotments. If allotments are distributed according to current production, the industry may become locked into a market share status quo. Innovation can also be discouraged if a particular formulator develops an improved product using less (or no) VOC's, but is made to release the formulation to the entire industry. Additionally, unless there is a guarantee of stable regulations, industry will be hesitant to commit money to developing low VOC products that may eventually come under regulation or be banned. Innovation in a regulated industry is assumed to be a high-risk endeavor. According to industry representatives, a satisfactory regulatory strategy will need to consider this risk and provide incentives for innovation and industry growth.

In response to this concern, the EPA and some industry representatives pointed out that there is already a growing market for environmentally sound products. Rather than inhibit growth, regulation could act as a stimulator for entirely new markets and new product lines.

Industry representatives further pointed out that there is little room left for consumer product VOC content reduction. It was emphasized that VOC's are an expensive ingredient, and that use of VOC's in consumer products has already been minimized in order to optimize profits. Reformulation, consequently, does not seem to be a promising alternative in many cases. Additionally, it was pointed out that formulating products with less VOC may create less effective products. Consumers may respond by simply using twice as much of the product, and thereby negating any gains in emission reductions, or they may stop buying the product altogether, eliminating a market.

3.3.4 Conclusions

In conclusion, all participants agreed that this exchange was productive and should be continued. Several industry representatives would like to remain in communication with each other and with the EPA representatives. The EPA representatives also emphasized the need for this continued exchange and gave names and phone numbers of appropriate Agency personnel to be contacted for information and discussion. Industry participants showed an interest in the regulatory development procedure, and how to be involved in the public comment period. This information was also given by the EPA representatives.

Once again, the industry representatives stressed the need for a reliable VOC inventory, their need to anticipate regulatory actions and subsequent market reactions, and their conviction that relative ozone formation potential of different solvents must be considered in regulating consumer product VOC emissions.

3.4 HOUSEHOLD PESTICIDES

3.4.1 Current Research Activities

Industry participants described a project that the Chemical Specialties Manufacturing Association (CSMA) is undertaking in conjunction with NYDEC. The Court ordered NYDEC to regulate VOC's and approved a four year study to determine how to regulate VOC emissions from consumer air fresheners, disinfectants and insecticides. An industry consortium, through CSMA, is developing a protocol to identify VOC control strategies which maintain product efficacy, while reducing non-active ingredient VOC emissions into the ambient air to the maximum extent feasible. The study is intended to:

1) determine technologically-feasible ways to reduce VOC's (through reformulation, total alteration, changes in pressurants for aerosols, for example) and 2) evaluate control-mechanism impacts (including economic and societal impacts). For the purposes of this study, VOC was defined by a specific vapor pressure. This is a court-ordered process, and CSMA will report the results of their evaluation to the Court through NYDEC. CSMA expects to work with several other regions on similar studies.

3.4.2 Recommendations for Additional Research

The work group felt that a national study similar to the New York study should be initiated. The participants agreed that one study for the entire country would be more helpful than regional or statewide studies whose results may or may not be transferable to the national scale. In addition, compiling data on a national scale would preclude the need to prepare distribution estimates. Though limited by confidentiality, the necessary formulation and annual production data for household pesticides are already housed with the EPA's Office of Pesticide Programs (OPP). The CSMA member companies and other members of the pesticide industry expressed a desire to work with the EPA in designing and implementing a study of this nature, in order to develop credible emissions data. The work group felt that this type of study will require at least four years to complete, considering the fact that the New York study will evaluate only two product categories in four years and will include only one percent of the total pesticide products used in the U.S.

3.4.3 Need for Federal Preemption over State Regulations

The overwhelming feeling of the work group was that the Federal government must take the lead in setting reduction targets for VOC levels in consumer products. This feeling stems from the concern that existing and anticipated State regulations may not be consistent with one another. It was felt that the EPA could best help industry by impressing upon legislators that Federal preemption over State regulations is necessary in the Clean Air Act Amendments with special State needs addressed when proven necessary. Industry representatives stressed that their ongoing research efforts are hampered by the lack of a fixed reduction target and inconsistent State requirements.

Expediting the Federal government's leadership role in this process may also eliminate the initiation of other independent State efforts.

3.4.4 Consistency with FIFRA Regulations/Internal EPA Coordination

The OPP registration process required by FIFRA includes toxicity testing, labelling restrictions, and formulation and annual production reporting. Not only will it be difficult for industry to develop and conduct the appropriate toxicity testing for major product reformulations, but the approval process also will be very difficult for OPP to administer in a timely manner without increased resources. An example was given to illustrate the conflicting program requirements: methylene chloride cannot be approved for use under FIFRA, but it would be exempt from consideration as a VOC. The work group felt that the EPA must begin immediate coordination among the affected program offices. In addition to FIFRA, the EPA must also coordinate with the greenhouse gas issue concerning CFC's; the Toxic Substances Control Act (TSCA) and the Resource Conversation and Recovery Act (RCRA) requirements may also come into play. The work group cautioned that the EPA must be aware that restrictions imposed by FIFRA are unique to the pesticides product category, and that the OPP approval process will become significantly more complex when VOC regulations are promulgated. It must also be kept in mind that the setting of strict deadlines will be unrealistic unless the OPP approval process can be expedited. In general, industry asks that the EPA act consistently across all program offices.

3.4.5 Regulation Must Not Discourage Innovation

The work group's discussion concerning innovation and flexibility focused on ways to avoid discouraging innovation with regulation. Towards that end, the work group reiterated that Federal regulation should preempt State activities and provide nationally consistent regulations. In particular, the work group asked that the EPA define a standard test method for measuring VOC emissions and better define "VOC", with reactivity taken into consideration.

Industry also asked that the EPA consider focusing on a subset of VOC's whose elimination will have the greatest environmental impact. The avoidance of outright solvent bans is also important in assisting technological development. A "miracle solvent" is not likely to be found, and response to regulation will vary from product to product. It is important for the EPA to understand that for some pesticide products, VOC's cannot be completely eliminated.

Additionally, the EPA could avoid discouraging innovation by including an efficacy protection clause in any forthcoming regulation. The EPA should not promote less efficient formulations simply to control VOC; the end result may be that consumers are forced to use more of the product to achieve the desired result, thus emitting the same amount of VOC. Industry is further hesitant to market a low VOC product before legislation is enacted, because if an across-the-board VOC reduction is promulgated, those who have already reduced product VOCs will be penalized. A baseline needs to be established now, or there will continue to be no incentive to market low VOC products.

3.4.6 Effect of Regulations on Markets

The work group expressed the concern that efficacy and cost be considered in regulatory development. Also, the costs to consumers must remain reasonable. As discussed above, consumers will not be satisfied if product efficacy is decreased and more product is required. (An efficacy protection clause is included in the New York regulation.) This issue will also affect OPP considerations since consumer exposure to a product may be increased because of decreased efficacy.

Industry representatives also stated that competition for market share will drive technology, and that the companies to first market an "environmentally safe" product will be at an advantage. The fear was expressed, however, that larger corporations will be at an economic advantage due to their greater available R&D resources. Participants suggested that forcing technology may actually mean that some companies will be "regulated out of business."

3.4.7 Regulatory Burden on Formulators

The possibility that the EPA will initiate a program to force technology was discussed in the work group, and it was stated that the segment of industry most affected by this type of program would have the least control over the development of new technology. The pesticide industry is a very small part of the solvent suppliers' business; thus, the supplier would have no financial interest in taking on the responsibility or liability of developing substitutes for pesticides. Similarly, the pesticide formulators are in no position to develop alternative delivery systems for their aerosol products. In addition, the active ingredients in household pesticides have been developed for agricultural uses, and then formulated for consumer use. Therefore, only 10% by volume of the active ingredient produced are used in the household pesticide products. Because of the low volume of consumer pesticides, the producers of the active ingredients for pesticides will have little or no incentive to develop new active ingredients for use in non-VOC systems of regulated consumer pesticides. Thus, the burden will fall on the household pesticide formulators to develop both new formulations and delivery systems.

3.5 ADHESIVES AND SEALANTS

3.5.1 Recommendations for Additional Research

The industry participants in the Adhesives and Sealants Work Group generally questioned whether regulation of VOC emissions from adhesive and sealant products is warranted on the basis of their contribution to ozone formation. Therefore, they agreed that the first step to be taken in considering regulatory strategies for VOC emissions from adhesive and sealant products is to conduct a thorough study of these products, including analyses of:

- The formulation of adhesive and sealant products;
- The quantity and types of VOC's emitted from different products;

- The effect of different application and product delivery systems on VOC emissions; and
- The impact of specific VOC's on ozone formation.

One goal of this study should be to develop information that can be used to compare products on the basis of the quantity of VOC's emitted per household over a year's time. This study would then be used as the basis for decisions by the EPA on which products, if any, warrant regulation. Products that do not have high VOC contents should be excluded from regulation. Similarly, products emitting VOC's that do not contribute significantly to ozone formation should be excluded from regulation.

3.5.2 Definition of VOC Content

Participants in the work group were concerned that "VOC" is not adequately defined, or that the definitions developed by the EPA, the American Society for Testing and Materials (ASTM), and various States are conflicting, and that equations for calculating VOC content differ. They recommended that the EPA define "VOC" before developing control strategies, and that individual industries and trade associations participate in the development of this definition. It was also recommended that the EPA and industry define the equations for calculating VOC content. A related issue raised in the discussions was the need to develop test methods for detecting and measuring VOC emissions from adhesive and sealant products. These test methods should take into account the methods of applying the product, the volatility and reactivity of the VOC's in the product, and the contribution of those VOCs to ozone generation.

3.5.3 Diversity of Adhesives and Sealant Industry

The participants agreed that any regulatory program for adhesives and sealants should address specific products, rather than general categories of products. The most important distinction cited by the group is between products that have a high solvent content and those that have been formulated to contain relatively small amounts of VOC. An across-the-board emission reduction requirement for all products would disadvantage low-solvent products, which already have minimal VOC emissions, while possibly achieving inadequate VOC reductions from high solvent content products. Distinguishing low-solvent from high-solvent content products would also recognize that companies are likely to reduce the cost of a product by reducing the solvent content whenever possible.

The work group members also urged that the "social value" (i.e., benefit to human welfare) of a product should be a basis for distinction. The solvent content of products that couple a higher social value with a higher VOC content should not be required to be reduced if the effectiveness of the product would be reduced.

A final distinction urged would be based on the opportunity for VOC emissions reduction presented by certain products. Those products that can be readily controlled could be regulated more stringently than those that are difficult to control. For instance, the method of application of a product might be changed in some instances to reduce emissions, in lieu of or in combination with a reformulation of the product.

3.5.4 Need for Federal Preemption over State Regulations

The work group members said that it is important to their industry that emission standards for consumer products be consistent nation-wide, and that the most effective way of achieving this goal is for Federal standards to preempt State and local standards. Consistent standards will prevent companies from having to formulate, test, and market their products differently depending on where they will be marketed. Nationally consistent requirements will also benefit the end user by controlling compliance costs.

3.5.5 Economic Incentives

The industry participants in the work group felt that economic incentives for reducing emissions (e.g., excess emission fees) should be set at a level sufficient to cause companies to reformulate or redesign their products. They expressed a concern that some companies may be under market pressure to pay an emission fee, rather than reduce emissions. By doing so, they would avoid the high costs of researching and developing new product formulations or delivery systems, and maintain consumer acceptance of the established product.

3.5.6 Effect of Regulations on Markets

The work group members pointed out that requiring controls on VOC emissions from adhesive and sealant products will have a significant effect on the market for those products. Reformulation of a product to eliminate organic solvents may result in reduced consumer satisfaction with the reformulated product and in lower sales of that product. Not only is this true for the general population of consumers, but it is particularly true for industries and trades that have product specifications that call for organic solvent-based formulations. Reformulation may also result in increased rates of application of a product that consumers perceive to be less effective than the original, which would adversely affect the emission reductions sought through the regulation.

3.5.7 Regulatory Burden on Formulators

The participants in the work group agreed that the focus of any regulation limiting VOC emissions from adhesive and sealant products should be on the product formulator. Formulation is the point at which the final product is manufactured and the mixture of solvent-containing materials decided upon. The formulators are also relatively few in number, compared to retailers or consumers, and consequently are the easiest point in the market to regulate. In addition to regulating formulators, any standards for emissions from adhesive and sealant products should also address imported products by making importers responsible for the compliance of the products they introduce in the market in this country.

3.5.8 Evaluation of Regulatory Approaches

3.5.8.1 Command and control--

The industry participants agreed that a regulation limiting the organic solvent content of a product or products would be preferable to a regulation requiring an across-the-board reduction in VOC emissions from all products. Limiting the organic solvent content of a product or products would benefit those products and manufacturers that have already invested in reformulation to reduce emissions, while requiring manufacturers of high solvent content products to take action to comply with the regulation. Requiring uniform VOC emission reductions would benefit high-solvent products, which have a greater opportunity for reducing emissions through reformulation. Low-solvent products, on the other hand, already have low emissions and it would be difficult to reduce them further.

3.5.8.2 Bubble regulations--

The industry representatives said that regulation that allowed a company to allocate the solvent content or VOC emission reductions among the company's various products would result in the most cost effective controls being applied, and would give the company the option of retaining specific high-value, high-solvent products by achieving reductions in emissions from other products. On the other hand, regulations controlling VOC emissions from specific adhesive and sealant products, rather than categories of products, would have the smallest effect on competition between products, since all products would be treated similarly. Further, product specific regulations would simplify recordkeeping and enforcement of the regulation. In the absence of a bubble, compliance could be determined by testing any single product; with a bubble, compliance could only be determined by testing all of a company's products.

3.5.8.3 Emission fee system--

Inclusion of an excess emission fee system as part of a VOC regulation for adhesive and sealant products would benefit the industry by providing companies with a way to continue producing products that do not meet an emission or solvent content limit. This could allow the company to keep marketing the product while attempting to reformulate or redesign it to reduce emissions. It could also allow companies to continue producing specified high-solvent products if the benefits of those products outweighed the cost of the emission fee. The problems with an emission fee system are that it may not achieve the emission reductions desired (since companies can pay the fee in lieu of reducing emissions) and setting the level of the fee would be complex and difficult. The fee would have to be proportional to market size in order to have an equitable effect, since a high fee would have a more significant impact on a small company than on a large one. The fee could be applied on a per unit of product basis to reflect company size and resources. For the EPA to set the fee at a level that would be equitable, reduce emissions, and separate the high-value products from the low-value products would require industry input to the fee-setting process.

3.5.8.4 Allotment system--

The work group reacted negatively to basing regulations on an allotment system, because this system would allow a company to approach a monopoly in an industry by controlling allotments and would limit the entry of new companies into the industry. An allotment system would also reward companies with the highest historical emissions by providing them more allotments, putting at a disadvantage companies that have made efforts to reduce emissions. The only positive aspect of an allotment system recognized by the work group was that it would alleviate the problem of setting an emissions fee by letting the market for allotments set the price.

3.6 AEROSOL PAINTS

3.6.1 Diversity of Aerosol Paint Industry

In the Aerosol Paint Work Group's initial discussion, industry representatives agreed that the aerosol paint industry is too big and diverse to be regulated as one entity. Each area has unique requirements and limitations. The work group agreed that the regulatory process would require a combination of approaches - command and control, averaging, and economic incentives - tailored for the specific product categories within the aerosol paint industry.

3.6.2 Definition of VOC Content

Industry representatives felt that the California definition of "weight VOC per gallon of product minus water" was not applicable to the aerosol paint industry, since their product is packaged in pressurized containers where the VOC used as the propellant is lighter than that used as the solvent. Therefore, removing the propellant would increase the weight VOC/volume coating. It was suggested that a more relevant definition would include a ratio of weight VOC to weight solids. Industry representatives felt that some reduction in VOC emissions would be possible by substituting water for solvent without changing the solids content.

3.6.3 VOC Inventory for Aerosol Paint Industry

Industry representatives felt very strongly that the aerosol paint industry needs a baseline emission inventory against which to measure progress in emission reduction and market acceptance of new products.

It was suggested that industry work on its own to produce an accurate inventory. However, there was concern that the confidentiality of information would make such an approach impossible. No real solution was found to the inventory issue, but representatives from the EPA felt that inability to develop of an inventory would not preclude development of a regulation.

3.6.4 Industry's Role in the Regulatory Process

The aerosol paint industry has been sensitized to the need for change. The industry representatives agree that it is in their best interest to participate actively in the regulatory process. The work group agreed that industry should provide information to the regulators on the specific needs of the aerosol paint industry. They felt that one of the first steps should be the formation of an industry task force to further discuss the issues raised at the symposium and to develop a model plan for reducing VOC emissions.

3.6.5 Recommendations for Additional Research

The aerosol paint industry was initially motivated to reduce their products' VOC emissions by promulgation of the California regulation. Research activities are still in their infancy and include a variety of approaches to VOC emission reduction. Specific research projects were not discussed because this information is considered confidential. The work group members agreed that any response to regulation should address environmental responsibility for products "from cradle to grave", since other regulations (e.g., air toxics, workplace hazards, waste disposal) would also apply to these products.

There was some discussion of promoting the recycling of aerosol paint cans and recovering the VOC. There is some feeling that, since these cans are not completely emptied during use, they are a source of VOC emissions as they disintegrate in landfills. However, industry participants felt certain that aerosol products typically do get used in their entirety and that recycling is not a valid issue.

4.0 AGENDA AND ATTENDEES

SYMPOSIUM ON REGULATORY APPROACHES FOR REDUCING VOC EMISSIONS FROM THE USE OF CONSUMER PRODUCTS

Tuesday
November 14, 1989

Regulatory Emphasis

	Moderator	John Calcagni, Director Air Quality Management Division, Office of Air Quality Planning and Standards (OAQPS)
8:00	Registration	
8:30	Welcome	John O'Connor Deputy Director, OAQPS
8:35	Introduction/Objectives Overview of VOC Regulatory Programs and the Nonattainment Problem	John Calcagni, Director Air Quality Management Division, OAQPS
9:15	Status of the Clean Air Act Amendments	Bill Harnett Emission Standards Division, OAQPS
9:45	Break	
10:15	Possible EPA Control Strategies for Consumer Products	Brock Nicholson Air Quality Management Division, OAQPS
10:45	Industry's View of Regulating Consumer Products	Ralph Engel Chemical Specialties Manufacturers Assoc.
11:15	Use of Market-based Approaches to Reduce VOC Emissions from the Use of Consumer Products	John Chamberlin Office of Policy, Planning, and Evaluation
11:45	Distribution of Questions to Product Category Work Groups	John Calcagni
12:00	Lunch	
1:00	Concurrent Product Category Work Groups	
2:30	Break	
3:00	Concurrent Product Category Work Groups	
5:00	Adjourn	

Wednesday
November 15, 1989

Technical Emphasis

	Moderator	Jim Weigold Deputy Director Emission Standards Division, OAQPS
8:00	California Regulatory Activities	Dean Simeroth California Air Resources Board
8:30	The Functions of VOC's in Consumer Products	Ike Emery, Vice Pres. Helene Curtis
9:00	New York Regulatory Activities	Ted Davis New York Dept. of Environmental Conservation
9:30	Reformulation and Safety Testing - Their Timing and Costs	Theodore Wernick Gillette Medical Evaluation Laboratories
10:00	Break	
10:30	New Jersey Regulatory Activities	Sandra Chen, New Jersey Dept. of Environmental Protection
11:00	The Socioeconomics of Regulating Consumer Products	Edward Heiden Heiden Associates, Inc.
11:30	EPA Research Toward Reduction of VOC Emissions from Consumer Products	Mike Kosusko, Office of Research and Development
12:00	Lunch	
1:00	Concurrent Product Category Work Groups	
2:30	Break	
3:00	Work Group Summary Presentations	Work Group Co-chairs
4:45	Adjourn	

PRODUCT CATEGORY WORK GROUPS

Personal Care Products

Dean Simeroth	CARB	Govt Co-chair
Kevin Loftus	Gillette Corp.	Ind Co-chair
Harry McCain	Aeropres Corp	
C. Kelly Burton	S.C. Johnson	
Leonard Drell	Demert & Dougherty	
Robert Jamieson	Procter & Gamble	
Wallace Coscarelli	American Cyanamid - Shulton	
John Lazar	Carter-Wallace Corp	
Ike Emery	Helene Curtis	
Cynthia Greene	EPA-Region 1	
Al Vervaert	EPA/OAQPS	

Household Care Products

Ted Davis	NYDEC	Govt Co-chair
Richard Bednarz	Amway Corp	Ind Co-chair
Richard Sedlak	SDA	
Robert Koenig	Procter & Gamble	
Armin Clobes	S.C. Johnson	
Ramon Llenado	Lehn & Fink	
William Wilderson	Scott's Liquid Gold Inc.	
John Ferguson	The Drackett Co.	
Eileen Moyer	Airwick Industries	
Lorraine Lillis	CPL	
Matthew McCarthy	EPA-Region 2	
James Crowder	EPA/OAQPS	

Automotive Products

John Chamberlin	EPA/OPPE	Govt Co-chair
Alan Rogers	First Brands Corp	Ind Co-chair
Graham Reed	Blue Coral	
Jerone Newberry	Pennzoil	
Jim Namnath	Chevron Chemical	
Norwin Wolff	Interpolymer Corp	
Laurence Midtbo	IKI Mfg Co	
Robert Hamilton	Amway Corp	
Clayton Smith	TACB	
Bill Johnson	EPA/OAQPS	

Household Pesticides

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Dean O'Hair	Chevron Chemical	Ind Co-chair
James Case	S.C. Johnson	
Steven Rogosheske	McLaughlin, Gormley, King	
Bernard Weinstein	Boyle-Midway	
Jay Price	Dowbrands	
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Adhesives and Sealants

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Tom Tupa	Loctite Corp	
Greg Walsh	Darworth Co	
Steve Rosenthal	EPA-Region 5	
Wade Ponder	EPA/AEERL	

Aerosol Spray Paints

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Robert Graham	Sprayon Products	Ind Co-chair
Jim O'Connor	Rustoleum	
Karl Schultz	Dupont	
Steve Chalmers	Guardsman Prod., Inc.	
Gus Leep	Seymour of Sycamore, Inc.	
Edward Majkrzak	General Paint and Chemical	
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